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## IXIAS MOULMEINENSIS.

Plate 588, fig. 1, ♂, 1e, ♀ (Wet-season Brood), 1b, ♂, 1c, ♀ (Dry-season Brood), 1a, 1d, ♂ ♂ (Extreme Dry-season Brood, two forms).

*Ixias Moulmeinensis*, Moore, Proc. Zool. Soc. 1878, p. 837, ♂ ♀ (Dry Form). Watson, Journ. Bo. Nat. Hist. Soc. 1894, p. 505, pl. 2, fig. 25 (Wet Form ♂), fig. 26 (Dry Form ♂); id. 1897, p. 669. Butler, Ann. Mag. Nat. Hist. 1886, p. 188; id. 1898, p. 139.

*Ixias Meipona*, Grose-Smith, Ann. Mag. Nat. Hist. 1887, p. 296; id. Rhop. Exot. i. ix. pl. 2, figs. 4, 5, ♂ (1888) (Wet Form).

*Ixias Pyrene*, Bingham (part), Fauna of Brit. India, Butt. ii. p. 193 (1907).

## Wet-season Brood (Figs. 1, 1e, ♂ ♀).

Male. Upperside clear pale yellow. *Forewing* with the sub-apical orange-red fascia somewhat narrower than in the *Wet* form of *Latifasciatus*, its black inner border being also narrower. *Hindwing* with the marginal band also much narrower. Underside clear pale yellow; discocellular spot small; the dusky patch at posterior angle of the *Forewing* small and slightly defined.

Female. Very similar to the male. *Forewing* with the orange-red fascia smaller, its black borders broader, its inner border contracted in the middle, much thickened upwards and continued in a broad band along the costa to the base. *Hindwing* with the black outer border narrower and diffused. Underside similar to the male.

Expanse, ♂ 2, ♀  $2\frac{1}{4}$  inches.

## Dry-season Brood (Figs. 1b, 1c, ♂ ♀).

Male. Upperside clear pale yellow. *Forewing* with the black inner border of the orange-red sub-apical fascia slightly narrower than in the *Wet* form. *Hindwing* with the marginal band narrower. Underside ochreous-yellow. Both wings with delicate slender strigæ, transverse discal spots with whitish centres. *Forewing* with a large dusky discocellular spot. *Hindwing* with a small similar spot.

Female. Upperside clear pale yellow. *Forewing* with a moderately broad orange-red sub-apical fascia, its black inner border being slender medially and broad anteriorly, the basal costal area broadly blackish-grey. *Hindwing* with the black marginal band broader than in the male. Underside similar to the male, the transverse discal spots with whitish centres, the discocellular spot more prominent. *Forewing* also with a dusky patch at the posterior angle.

Expanse, ♂ 2 to  $2\frac{1}{4}$ , ♀  $1\frac{3}{4}$  to  $2\frac{1}{4}$  inches.

## Extreme Dry-season Brood (Figs. 1a, 1d, ♂ ♂).

Male. Upperside pale yellow. *Forewing* with the orange-red fascia larger and the black borders narrower than in the ordinary Dry form. *Hindwing* with the marginal band narrower, sometimes consisting of small spots or entirely unmarked.

Underside similar to the *Dry* form, except that both wings have the discal spots more developed.

Female. Upperside pale yellow. *Forewing* with the sub-apical fascia orange-red, its black inner band composed of an anterior oblique even-edged bar, from which to beneath the middle median veinlet the edge is not black scaled, and from thence to the posterior angle it is much narrower than in the ordinary dry female. *Hindwing* with marginal band slightly developed, narrow, often macular. Underside similar to the male.

Expanse, ♂ ♀ 2 to  $2\frac{1}{4}$  inches.

HABITAT.—Maulmein to Meetan, Burma.

*Note*.—In Fig. 1a the artist unfortunately copied a male instead of a female of the extreme Dry-season Brood.

#### IXIAS CITRINA.

Plate 588, fig. 2, ♂, 2a, ♀ (Wet-season Brood), 2b, ♂ (Dry-season Brood).

*Ixias Citrina*, Moore, Proc. Zool. Soc. 1878, p. 837 (Dry Form).

*Ixias Verna*, Bingham (part), Fauna of Brit. India, Butt. ii. p. 195 (1907).

#### Wet-season Brood (Figs. 2, 2a, ♂ ♀).

Male. Upperside pale yellowish-white. *Forewing* with the sub-apical orange-red fascia comparatively broader anteriorly and shorter posteriorly, its black inner border narrower than in *Pallida* = *Wet Latifasciatus*. *Hindwing* with the marginal band also half its width. Underside pale yellow. Both wings with slightly apparent strigæ, discal ordinary disposed spots and discocellular spots.

Female. Upperside very pale yellow. *Forewing* with the sub-apical fascia often pale yellow, its black inner border medially slender and sometimes broken. *Hindwing* with the marginal band broader than in the male. Underside similar to the male, the posterior patch on the forewing being larger.

Expanse, ♂ ♀  $2\frac{1}{4}$  inches.

#### Dry-season Brood (Fig. 2b).

Male. Upperside pale yellowish-white. *Forewing* similar to the *Wet* form. *Hindwing* with the marginal band narrower. Underside more ochreous, with the strigæ, discocellular spot, and discal markings darker, the latter with whitish centres.

Female. Not known.

Expanse,  $2\frac{1}{4}$  inches.

HABITAT.—Tenasserim, South Burma.



## IXIAS MARIANNE.

Plate 589, figs. 1, 1a, ♂ ♀ (Wet-season Brood), 1b, 1c, ♂ ♀ (Dry-season Brood), 1d (Another Form), 1e, ♀ (Another Form with pinkish tinge), 1f, 1g, ♂ ♀ (Extreme Dry-season Brood).

*Papilio Marianne*, Cramer, Pap. Exot. iii. pl. 217, figs. C, D, ♀, E, ♂ (1780) (Wet Form).

*Papilio Sesia*, Fabricius (part), Mant. Ins. p. 22 (1787).

*Thestias Marianne*, Boisduval, Spéc. Gen. Lep. i. p. 592 (1836). Doubleday, Gen. D. Lep. p. 61 (1847). Butler, Catal. Fabr. Lep. B. M. p. 216 (1869).

*Ixias Marianne*, Hübner, Verz. bek. Schmett., p. 95 (1816). Butler, P.Z.S. 1871, p. 253. Moore, Lep. Ceylon, i. p. 126 (1881); id. Proc. Zool. Soc. 1882, p. 254. Watson, Journ. Bo. Nat. Hist. Soc. 1890, p. 36. Betham, Journ. Bo. Nat. Hist. Soc. 1891, p. 324. Watson (part), Journ. Bo. Nat. Hist. Soc. 1894, pp. 504, 507, pl. 2, figs. 17, 18, 19. Butler, Ann. Mag. Nat. Hist. 1898, p. 143. Mackinnon and de Nicéville, Journ. Bo. Nat. Hist. Soc. 1898, p. 591, de Rhé-Philipe, Journ. Bo. Nat. Hist. Soc. 1902, p. 492. Bingham, Fauna of Brit. India, Butt. ii. p. 196 (1907).

*Pieris Marianne*, Godart, Enc. Méth. ix. p. 120 (1819).

*Pontia Marianne*, Horsfield, Catal. Lep. Mus. E.I.C. p. 142 (1829).

*Ixias Bebryce*, Hübner, Verz. bek. Schmett. p. 95, ♂ (1816).

*Anthocharis Marianne*, Lucas, Lep. Exot. pl. 35, fig. 1, ♂ (1845).

*Ixias Agnivena*, Moore, Ann. Mag. Nat. Hist. 1877, p. 50, ♂ ♀ (Extreme Dry). Butler, Proc. Zool. Soc. 1880, p. 150. Swinhoe, Proc. Zool. Soc. 1885, p. 141.

*Ixias Depalpura*, Butler, Proc. Zool. Soc. 1883, p. 153, pl. 24, figs. 6, 7, ♂ ♀ (Extreme Dry), Swinhoe, Proc. Zool. Soc. 1886, p. 432.

*Ixias Meridionalis*, Swinhoe, Proc. Zool. Soc. 1885, p. 140, pl. 9, fig. 5, ♀ (Dry Form); id. 1886, p. 432.

*Ixias Cumballa*, Swinhoe, l.c. p. 141, pl. 9, figs. 13, 14, ♂ ♀ (Wet Form).

## Wet-season Brood (Figs. 1, 1a, ♂ ♀).

Male. Upperside white, the basal areas and the inner edge of the black oblique band in the forewing tinged with bluish-grey. *Forewing* with a broad sub-apical orange-red fascia (broader than in all other Indian species), the upper discocellular portion only of which is always present; the black inner oblique transverse border broad. *Hindwing* with the black marginal band broad and continuous. Upperside pale sulphur-yellow. Both wings with a few outwardly-disposed very slightly defined slender dusky strigæ. *Forewing* with the basal area white, the subapical area medially flushed with pale orange; a black large discocellular spot, centred with a white dot, a transverse discal series of small black spots, a black patch at the posterior angle, and a streak on the end of the middle median veinlet. *Hindwing* with a small black discocellular spot with white centre, and a transverse discal series of blackish-brown spots, of which the middle two, three, or four are the larger and pale-centred.

Female. Upperside white as in the male, or very rarely the ground colour is slightly orange-tinted. *Forewing* with the basal area tinged with darker bluish-grey than in the male, the sub-apical orange fascia narrower, sometimes whitish apically,

and traversed by four black spots, its inner black border being sometimes narrower than in the male. *Hindwing* with the black marginal band broader than in the male. Underside similar to the male (or rarely the ground colour is of an ochreous tint, which is brightest in the forewing) except that all the markings are more prominent.

Expanse, ♂ ♀  $2\frac{1}{4}$  to  $2\frac{1}{2}$  inches.

Dry-season Brood (*Meridionalis*), (Figs. 1b, ♂, 1c, 1d, 1e, ♀).

Male. Upperside white. *Forewing* similar to the *Wet* form, the black inner border of the orange fascia generally slightly narrower. *Hindwing* with the black marginal band also narrower. Underside similar to the *Wet* form, the transverse series of discal spots being more developed, and those on the hindwing white-centred.

Female. Upperside white. *Forewing* with the sub-apical orange fascia as in the *Wet* form, its black inner border anteriorly formed by an oblique bar, terminating at the lower end of the cell, the ordinary medial portion being absent, or sometimes very slightly indicated by a few slightly defined scales, and the lower end pointedly terminating at the posterior angle. *Hindwing* with the black marginal band sometimes narrower, sometimes broader, than in the male. Underside deeper yellow than in the *Wet* female. *Forewing* with the sub-apical orange flush brighter, the discocellular spot and outer markings more prominent, the upper discal spots pale-centred. *Hindwing* with the markings more prominent, all the discal spots being more prominent, larger, and white-centred.

Expanse, ♂ ♀  $1\frac{3}{4}$  to 2 inches.

Extreme Dry-season Brood (*Agnivena* = *Depalpura*), (Figs. 1f, 1g, ♂ ♀).

Male. Upperside white. *Forewing* with the black inner border of the subapical orange fascia narrower than in the ordinary *Dry* form. *Hindwing* also with the black marginal band narrower. Underside of deeper and duller yellow; the markings similar. *Forewing* with the upper discal spots whitish-centred. *Hindwing* with the discal spots more distinctly white-centred.

Female. Upperside white. *Forewing* similar to the *Dry* form; the medial portion of the inner band of the orange fascia without any traces of black scales. *Hindwing* with the marginal band somewhat narrower. Underside similar to the male.

Expanse, ♂ ♀  $1\frac{3}{4}$  to 2 inches.

LARVA.—Pale green, with a lateral pale reddish narrow band; feeds on *Capparis sepiaria* (Grote).

PUPA.—Pale green, anteriorly bent backwards; head pointed in front; thorax dorsally convex; wing-covers much produced and convex in front, with a slightly reddish sub-apical patch; abdomen pointed at end.

HABITAT.—Throughout the plains of India and Ceylon, except in the desert portions.

DISTRIBUTION.—Eastern Provinces, Plains, also in forest lands; fond of damp spots (Hutchinson, Ceylon). Taken by us (*Meridionalis*) at Poona in October and November; in Bombay, December; Belgaum, September and October; Ahmednuggur, October and November; in Bombay (Cumballa), July and August; Hambantotte and Mulliatum, Ceylon, common (Wade). Watson reports its capture in Mysore, Betham in the Central Provinces, Mackinnon in Mussoorie, and de Rhé-Philipe at Lucknow, and we have it from Manipur, Deesa and Karachi.

#### IXIAS NOLA.

Plate 590, figs. 1, 1a, ♂ ♀ (Wet-season Brood), 1b, 1c, ♂ ♀ (Dry-season Brood), 1d, 1e, ♂ ♀ (Extreme Dry-season Brood).

*Ixias Nola*, Swinhoe, Proc. Zool. Soc. 1889, p. 399. Watson, Journ. Bo. Nat. Hist. Soc. 1894, p. 504. Butler, Ann. Mag. Nat. Hist. 1898, p. 143. Bingham, Fauna of Brit. India, Butt. ii. p. 197 (1907). de Rhé-Philipe, Journ. Bo. Nat. Hist. Soc. 1908, p. 885.

#### Wet-season Brood (Figs. 1, 1a, ♂ ♀).

Male. Upperside white. *Forewing* with the sub-apical orange fascia much narrower throughout than in the *Wet* form of *Marianne*, being also curved uniformly outward, and without any trace of the ordinary red upper portion at end of the cell, its black inner border being of a similar broad width. *Hindwing* with a narrower, decreasing, posteriorly macular band, which terminates generally at the middle median veinlet. Underside pale yellow. *Forewing* with the basal area white; apex slightly flecked with grey strigæ, the sub-apical area being flushed with very pale orange; discocellular black spot large and with a minute white centred dot; ordinary blackish upper discal spots, the anterior one slightly whitish centred. *Hindwing* slightly flecked with grey strigæ, the discocellular spot small, brown, with white centred dot; discal spots more or less ill-defined, brownish, the centres whitish.

Female. Upperside white. *Forewing* of similar pattern to same sex in the *Dry* form of *Marianne*, the sub-apical orange fascia much narrower, with three traversing black spots only, its black anterior portion as in the *Dry* form of *Marianne*, broad and acutely angled at the lower end, the medial portion without any traces of dark scales. *Hindwing* with the marginal band similar to the male, but narrower and generally extending only halfway down the wing. Underside similar to the male.

Expanse, ♂ ♀ 2 inches.

#### Dry-season Brood (Figs. 1b, 1c, ♂ ♀).

Male. Upperside white. *Forewing* with the black inner border of the sub-apical orange fascia narrower throughout than in the *Wet* form, the medial portion being

more or less slender. *Hindwing* with the marginal band also narrower and usually extending only halfway down the wing. Underside similar to the *Wet* form, except that the transverse discal markings of the *hindwing* are more prominent and whiter centred.

Female. Upperside white. *Forewing* similar to the *Wet* form, the upper and lower portion of the black inner band to the sub-apical orange fascia narrower. *Hindwing* with the marginal band narrower. Underside similar to the *Wet* form, the discal markings less developed.

Expanse, ♂ ♀  $1\frac{3}{4}$  to 2 inches.

Extreme Dry-season Brood (Figs. 1d, 1e, ♂ ♀).

Male. Upperside white. *Forewing* similar to the ordinary *Dry* form, except that the upper portion of the black inner border of the sub-apical orange fascia is smaller and somewhat broken at the upper end of the cell, and the end of it is more equally quadrate, the medial edge of the fascia being without any dark scaling, or sometimes a few are slightly visible. *Hindwing* with a slightly-defined dusky upper marginal narrow macular band. Underside similar to the ordinary *Dry* form. Both wings with the markings similar but less developed.

Female. Upperside white. *Forewing* similar to the ordinary *Dry* female, except that the upper portion of the black inner band to the orange fascia is smaller and more equally quadrate posteriorly. *Hindwing* as in the male. Underside similar to the male, but paler throughout.

Expanse, ♂  $1\frac{1}{2}$  to  $1\frac{3}{4}$ , ♀  $1\frac{1}{2}$  inches.

HABITAT.—Mahableshwur.

Seems to be confined to the Mahableshwur Mountains; two stragglers were, however, taken by us at Poona in the month of April, and another by de Rhé-Philipe at Khandalla in October, 1907. Colonel Bingham (p. 197) suggests that it may be a variety of *Ixias Marianne*, but we have all the seasonal forms in a long series of this very distinct species in the British Museum and in our own Collection.

#### INDO-MALAYAN AND INDO-CHINESE SPECIES.

*Ixias Evippe*, Papilio Evippe, Drury, Ill. Exot. Ent. i. pl. 5, fig. 2 (1773). Butler, Ann. Mag. Nat. Hist. 1889, p. 136. Habitat, China.

*Ixias Venilia*, Pieris Venilia, Godart, Enc. Méth. ix. p. 121 (1819). Horsfield (Pontia), Cat. Lep. E.I.C. p. 143 (1829). Wallace, Trans. Ent. Soc. 1867, p. 392. Lucas, Lep. Exot. pl. 36, fig. 1 (1835). Butler, Ann. Mag. Nat. Hist. 1898, p. 135. Habitat, Java.

*Ixias Balice*, Thestias Balice, Boisduval, Spéc. Gen. Lep. i. p. 593 (1836). Wallace, Trans. Ent. Soc. 1867, p. 393. Butler, Proc. Zool. Soc. 1871, p. 253. Fruhstorfer, Berl. Ent. Zeit. 1894, p. 246, pl. 18, fig. 9, ♀. Habitat, Java.

*Ixias Ludekingii*, Thestias Ludekingii, Vollenhoven, Monog. Pieridæ, p. 49, pl. 5, fig. 6 (1865); id. Tijds. voor Ent. 1869, p. 126. Wallace, Trans. Ent. Soc. 1867, p. 396. de Nicéville, Journ. As. Soc. Bengal, 1895, p. 500. Habitat, Sumatra.



- Ixias Vollenhovii*, Thestias Vollenhovii, Wallace, Trans. Ent. Soc. 1867, p. 393. Butler, Ann. Mag. Nat. Hist. 1898, p. 135. *Synonym*, Thestias Venatrix, Wallace, l.c. p. 393. *Ixias Venatrix*, Butler, Proc. Zool. Soc. 1871, p. 254, pl. 19, fig. 1, ♂. Habitat, Java; described in error by Wallace as from Maulmein.
- Ixias undatus*, Butler, Proc. Zool. Soc. 1871, p. 252, pl. 19, fig. 4, ♂. Druce, Proc. Zool. Soc. 1873, p. 356. Butler, Ann. Mag. Nat. Hist. 1898, p. 137. Habitat, Borneo.
- Ixias verna*, Druce, Proc. Zool. Soc. 1874, p. 108, pl. 16, figs. 5, 6, ♂ ♀. Habitat, Siam.
- Ixias Insignis*, Butler, Cistula, Entom. ii. p. 431, pl. 8, fig. 1, ♂ (1877); id. Ann. Mag. Nat. Hist. 1898, p. 137. Habitat, Formosa.
- Ixias Birdii*, Distant, Ann. Mag. Nat. Hist. 1883, p. 351; id. Rhop. Malayana, p. 309, pl. 26, fig. 4, ♂ (1885). Butler, Ann. Mag. Nat. Hist. 1898, p. 137. Habitat, Malay Peninsula.
- Ixias Flavipennis*, Grose-Smith, in Forbes' Nat. Wanderings, p. 275 (1885). Butler, Ann. Mag. Nat. Hist. 1898, p. 135. Thestias Flavipennis, Snellen, Tijd. voor Ent. 1891, p. 335, pl. 16, figs. 1, 2, ♂, 3, 4, ♀. *Synonym*, Ixias Pyrites, Weymer, Stett. Ent. Zeit. 1886, pl. i. fig. 4, ♂; id. 1887, p. 13. Habitat, Sumatra.
- Ixias Yunnanensis*, Fruhstorfer, Soc. Entom. 1902, p. 81, ♀. Habitat, Yunnan.
- Ixias Malum-Sinicum*, Thieme, Berl. Ent. Zeit. 1896, p. 408. Habitat, Nias.

NOTE.—As regards China, this genus seems to be confined to the south; no mention of it is made by Leech in his Butterflies of China, Japan and Corea.

This practically ends Dr. Frederick Moore's contribution to these volumes; for the remainder I have his notes to go on; it is a very great pity he did not live to finish the entire work, the compilation of his lifetime; his notes are innumerable, and refer to the whole of the Heterocera as well as the Rhopalocera; his knowledge of the Lepidoptera of the Indian Region was very great; he was the father of all Indian Lepidopterists, always patient, kindly and courteous, never sparing time or trouble in helping workers who came to him for assistance; his industry was prodigious, his Books and Memoirs on the Indian Lepidoptera extend over a long period of years, many of them will remain as standard works; his Monograph of the *Limnaina* and *Euplœina*, published in the Proceedings of the Zoological Society, 1883, is a classic: his division of the different genera, though misunderstood by ordinary Collectors, was almost at once adopted by all scientific Lepidopterists in Germany, and is now universally adopted.

I must, of course, continue the work on Dr. Moore's lines, otherwise I should adopt the excellent trinomial system used by Messrs. Rothschild, Hartert, and Jordon; so much nonsense has been written about the multiplicity of names, and as to what is, or is not a species, the trinomial system seems to be necessary to show Collectors that, because a name is given to an insect, it does not mean that this insect represents a distinct species; the study of variation and of local and seasonal forms is the very essence of the theory of evolution, and for the sake of convenience, if for nothing else, every form must have a name: as I cannot use the trinomial system, I will endeavour to put the typical species first and follow on with the allied forms.

## Genus EUCHLOË.

*Euchloë*, Hübner, Verz. bek. Schmett. p. 94 (1816). Westwood, British Butterflies, p. 30 (1841).

Butler, Cistula, Entom. i. p. 39 (1870). Kirby, Cat. Diurnal, Lep. p. 505 (1871).

*Anthocharis*, Boisduval (part), Sp. Gen. Lep. i. p. 585 (1836). Doubleday, Gen. Diurnal, Lep. p. 55 (1847).

*Sinchloë*, Bingham (part), Fauna of Brit. India, Butt. ii. p. 179 (1907).

IMAGO. *Forewing*. Costa somewhat arched, apex obtuse, exterior margin slightly oblique; lower angle rounded, inner margin long and nearly straight, more than three-fourths the length of the costa; cell half as long as the wing, sub-costal nervure five-branched, the first two branches emitted before the end of the cell, the upper radial, thrown off a little beyond the cell, the middle discocellular nervule well marked; all the veins present. *Hindwing* longer than the forewing, costa somewhat arched, especially near the base, exterior margin and lower angle evenly rounded, inner margin nearly straight to near the base, then strongly concave; cell broad, lower discocellular the longest, middle discocellular short. Antennæ short, less than half the length of the forewing, club abrupt, broad and flat, palpi slender, third joint short; head and palpi very hairy in front.

Type, *Belia*, Linn., from Africa.

## EUCHLOË DAPHALIS.

Plate 590, figs. 2, ♂, 2a, ♀.

*Anthocharis Daphalis*, Moore, Proc. Zool. Soc. 1865, p. 491, pl. 31, fig. 14, ♂.

*Euchloë Daphalis*, Moore, Proc. Zool. Soc. 1874, p. 273.

*Synchloë Daphalis*, Leslie and Evans, Journ. Bo. Nat. Hist. Soc. 1903, p. 676. Bingham, Fauna of Brit. India, Butt. ii. p. 180 (1907).

*Euchloë Venosa*, Butler, Proc. Zool. Soc. 1880, p. 151, pl. 15, fig. 5.

Male. White, with the base of both wings irrorated with black scales. *Forewing* with the costal margin delicately chequered with black, a black band at the apex containing a large white spot and three or four marginal spots, its inner portion sinuous and attenuated hindwards, a transverse black spot at the end of the cell, more or less lunate. *Hindwing* without markings, but the pattern of the underside distinctly showing through the wing. Underside *Forewing* creamy-white, costa chequered with black, the discoidal spot with white centre, the apex chequered with pale greenish-brown, the interspaces being pale silvery white. *Hindwing* with transverse irregular bands of greenish-brown overlaid with greenish-yellow scales, the interspaces shining silvery white.

Female. Differs from the male chiefly in having a more rounded apex to the forewing.

Expanse, ♂ ♀  $1\frac{1}{4}$  inches.

HABITAT.—Western Himalayas.

DISTRIBUTION.—The type was taken at Kumaun, there are examples in the British Museum, and other collections from Chitral, Goorais Valley, Attock Bridge, Kairabad, and the Punjab. Mr. Lang, in his notes, says it is not likely to be caught by many persons, it flies high up in April, the brood is very early and very short-lived.

### EUCHLOË LUCILLA.

Plate 590, figs. 3, ♂, 3a, ♀.

*Euchloë Lucilla*, Butler, Proc. Zool. Soc. 1886, p. 376, pl. 35, fig. 4; id. Ann. Mag. Nat. Hist. 1888, p. 205.

*Anthocharis Lucilla*, Baker, Trans. Ent. Soc. 1889, p. 525.

*Synchloë Lucilla*, Bingham, Fauna of Brit. India, Butt. ii. p. 180 (1907).

Male. Upperside lemon-yellow. Both wings with the base irrorated with black scales. *Forewing* with a black band on the outer border, broad at the apex and narrowing hindwards, traversed obliquely by a more or less obscure macular band of the ground colour; cell closed by a very broad black bar. *Hindwing* without markings. Underside paler and duller. *Forewing* with the outer band showing through the wing and irrorated with minute black scales; the discoidal bar shorter; often a pink line along the costal and outer margins; the costa towards the apex with a series of small white spots, each spot containing a black dot. *Hindwing* with thick black irrorations, a small white spot at the end of the cell and a series of white transverse spots along the costal margin; antennæ brown tinged with yellow, head brown, collar pink, thorax brown, abdomen black on the sides and yellow beneath.

Female. Upperside pale sulphur-yellow. *Forewing* with the black outer marginal band similar in size to the male, the pale line traversing it generally much more prominent and distinct; the discocellular bar broader. *Hindwing* without markings. Underside as in the male, colour of the antennæ, head and body similar.

Expanse, ♂ ♀  $1\frac{1}{2}$  inches.

HABITAT.—The Punjab.

DISTRIBUTION.—The type was taken by Colonel Yerbury at Campbellpur; we have examples also from Attok and Khairabad.

### INDO-CHINESE AND JAPANESE SPECIES AND GENERA.

*Euchloë Scolymus*, *Anthocharis Scolymus*, Butler, Journ. Linn. Soc. 1866, p. 52. Elwes, Proc. Zool. Soc. 1881, p. 877. Pryer, Rhop. Nippon. p. 6, pl. 3, figs. 4a, 4b (1886). Leech, Butt. of China, Japan and Corea, ii. p. 479 (1893). *Synonym*, *Anthocharis Thunbergii*, De l'Orza, Lep. Japan, p. 14 (1869). Habitat, Japan.

*Euchloë Bambusarum*, *Anthocharis Bambusarum*, Oberthür, Et. d'Ent. ii. p. 20, pl. 3, fig. 4 (1876). Habitat, Chekiang, W. China.

- Euchloë Bieti*, Anthocharis Bieti, Oberthür Et. d'Ent. ix. p. 14, pl. 1, fig. 1, ♀ (1884); id. xi. p. 16, pl. 6, fig. 39, ♂ (1886). Habitat, North-Eastern and Western Thibet.
- Euchloë Thibetana*, Anthocharis cardamines, var. Thibetana, Oberthür, Et. d'Ent. xi. p. 16 (1886).  
Leech, Butt. of China, Japan and Corea, ii. p. 477 (1893). Habitat, Western China.
- Euchloë Orientalis*, Anthocharis Belia, var. Orientalis, Alphéraky, Rom. Mem. ix. pl. 6, fig. 1 (1897).  
Habitat, Western Thibet.
- Leucophasia Sinensis*, Leptosia Sinensis, Butler, Cist. Entom. i. p. 173 (1873). Habitat, Shanghai.
- Leucophasia Vibia*, Jansen, Cist. Entom. ii. p. 272 (1878). Habitat, Japan.
- Leucophasia Morsei*, Leptosia Morsei, Fenton, Butler, Proc. Zool. Soc. 1881, p. 855. Fenton, Papilio, ii. p. 35, figs. 3, 4, 5 (1882). Habitat, Japan.
- Agalais Gigantea*, Leucophasia Gigantea, Leech, Entomologist, xxiii. p. 45 (1890); id. Butt. of China, Japan and Corea, ii. p. 484, pl. 36, figs. 10, 11 (1893). *Agalais Gigantea*, Grote, Proc. Am. Soc. 1900, p. 13. *Synonym*, *Leucophasia immacula*, Leech, Butt. of China, Japan and Corea, p. 484 (1893). Habitat, Central and Western China.

## Genus HEBOMOIA.

- Hebomoia*, Hübner, Verz. bek. Schmett. p. 95 (1816).
- Iphias*, Boisduval, Sp. Gen. Lep. i. p. 595 (1836). Wallace, Trans. Ent. Soc. 1867, p. 396.

These large and handsome butterflies frequent the skirts of forest districts; the males often settle on the ground in damp or muddy places, in company with many Papilionidæ and Pieridæ; when thus resting the wings are erect; they are at once distinguishable from all around them by the peculiar attitude they assume, the upper wings being depressed between the lower pair, so that its basal half is completely hidden by them; as probably a consequence of this we find that this basal half of the upper wings is always pale in colour on the underside, and devoid of the characteristic markings of the exposed portions; the females fly rather low, in woods and thickets, and seldom come out into the open grounds, and are therefore less frequently captured (Wallace).

IMAGO. *Forewing* triangular, apex more or less acute, costa arched towards apex, exterior margin oblique, posterior margin recurved, costal vein extending to two-thirds the margin, first sub-costal branch rising at one-third and second at one-fourth before end of cell, third from the end, fourth branching from the third at one-fifth before its end, fifth absent; upper discocellular minute, oblique, vein 6 arising close to upper angle of cell, which is little more than half the length of the wing; middle and lower discocellulars concave, the lower slightly the longer.

*Hindwing* sub-oval, broad, exterior margin rounded and sinuous, angles also rounded, inner margin nearly straight to near base, where it is highly convex; pre-costal nervure short, simple, inclining outwards. Antennæ about half the length of the forewing, gradually thickened to apex, latter sub-truncate. Palpi situated low down the face, somewhat flattened, scaly, clothed with stiff hairs



anteriorly and at the apex, third joint short. Thorax and abdomen robust, legs slender; claspers in the male elongate.

LARVA.—Stout, tapering at both ends, green, with pale red-dotted stripe on the sides, and is shagreened on the upper surface.

PUPA.—Boat-shaped, like that of *Euchloë*, it is much arched, and produced into a long point at both ends. (Kirby, ii. p. 200, 1896.)

#### HEBOMOIA GLAUCIPPE.

Plate 591, figs. 1, ♂, 1a, ♀ (Wet-season Brood), 1b, ♂, 1c, ♀ (Dry-season Brood).

*Papilio Glaucippe*, Linnæus, Syst. Nat. i. ii. p. 762 (1767). Drury, Ill. Exot. Ent. i. pl. 10, figs. 3, 4. Cramer, Pap. Exot. ii. pl. 164, figs. A, C.

*Hebomoia Glaucippe*, Hübner, Verz. bek. Schmett. p. 96 (1816). Druce, Proc. Zool. Soc. 1874, p. 108. Wood-Mason and de Nicéville, Journ. As. Soc. Bengal, 1886, p. 371. Elwes and de Nicéville, Journ. As. Soc. Bengal, 1886, p. 431. Murray, Journ. Bo. Nat. Hist. Soc. 1888, p. 26. de Nicéville, Journ. Bo. Nat. Hist. Soc. 1890, p. 387. Manders, Trans. Ent. Soc. 1890, p. 355. Swinhoe, Trans. Ent. Soc. 1893, p. 308. Watson, Journ. Bo. Nat. Hist. Soc. 1897, p. 669. Fruhstorfer, Berl. Ent. Zeit. 1898, p. 174. Butler, Ann. Mag. Nat. Hist. 1898, p. 290. Fruhstorfer, Iris, 1902, p. 297; id. Soc. Ent. 1903, p. 42. Bingham, Fauna of Brit. India, ii. p. 274 (1907).

*Iphias Glaucippe*, Wallace (part), Trans. Ent. Soc. 1867, p. 396.

*Papilio Callirhoë*, Fabricius, Syst. Ent. p. 473, ♀ (1775).

#### Wet-season Brood (Figs. 1, 1a, ♂ ♀).

Male. Upperside creamy-white. *Forewing* with the costal line prominently black; a large orange-red apical patch bordered with black, the band rather deep at the apex, gradually narrowing downwards, sinuous on its inner side, and somewhat angulated on the veins; the inner band very sinuous, thinner than the outer band, but more uniform in width, and crosses the end of the cell; within the orange-red area are several more or less spear-shaped large black spots in a sub-marginal row, in the interspaces, and in most examples the two bands are joined together below vein 2 by a thick bar, leaving a large orange-red spot below it. *Hindwing* with some black triangular spots on the outer margin, mostly large at the middle of the margin, varying in number, also some two or three upper discal spots in most specimens. Underside. *Forewing* white, apical area of the upperside represented by an ochreous-pink patch, but without the black margins, the inner spear-shaped spots much paler than they are above, covered with brown strigæ, costal line brown. *Hindwing* suffused with ochreous-pink covered with brown strigæ, and with several brown spots varying in position, and with a brown line running from the base through the cell straight to the middle of the outer border.

Female. Upperside creamy white with a slight greenish tinge, the basal portion more or less irrorated with black atoms. *Forewing* with the apical patch larger than in the male, occupying nearly the apical half of the wing, the orange fascia much restricted, consisting generally of four or five orange-red streaks, the four larger lower streaks with large, black, spear-shaped spots in a sub-marginal row in the interspaces, the inner black band broad, almost uniform in width, joining the outer band hindward where it is much thickened and extends to the hinder angle. *Hindwing* with the outer marginal band broad, its inner margins dentated on the veins, a discal row of large sub-triangular black spots. Underside similar to the male, the brown transverse strigæ more dense, the spots more numerous, the costa of the forewing and the medial line of the hindwing darker and more prominent. Antennæ in both sexes dark brown, head and thorax with reddish-brown hairs in front, thorax above greyish-blue, abdomen white with a bluish tinge; on the underside, the head and thorax are brownish and the abdomen white.

Expanse, ♂ ♀  $4\frac{4}{10}$  inches.

Dry-season Brood (Figs. 1b, 1c, ♂ ♀).

Wings more falcate in both sexes, the ground colour on the upperside purer white. Male. *Forewing* with the apical orange-red fascia larger, the black surrounding bands correspondingly thinner, the inner band much attenuated, and less sinuous. *Hindwing* with the black spots on the outer margin all but obsolete. Underside very similar to the Wet-season form, the brown strigæ and spots more numerous.

Female. Upperside whiter than in the Wet-season form. *Forewing* with the apical orange-red fascia much larger, in some examples almost as large as in the male, the costa black; the outer black band of the fascia a little broader than in the male, the inner band less sinuous and more pronounced, the spear-shaped sub-marginal row of black spots larger and nearer the outer band. *Hindwing* with the discal spots smaller and more round, the band on the outer border thinner, often reduced to mere triangular spots. Underside much as in the male.

Expanse, ♂  $4\frac{4}{10}$ , ♀  $3\frac{9}{10}$  to 4 inches.

HABITAT.—N.E. India, Sikkim, Bhutan, Assam, Burma.

DISTRIBUTION.—Many examples in our Collection from the Khasia Hills and from Sikkim; reported from Chin Lushi by de Nicéville; from Burma by Murray and Fruhstorfer; from Tavoy by Elwes and de Nicéville; from the North Chin Hills by Watson; from the Shan States by Manders; from Siam, Annam, Tonkin, Hainan, and Hong Kong by Fruhstorfer; it is also found in the Malay Peninsula.

The LARVA and PUPA are from Horsfield's well-known drawings of the Java form (*H. Javanensis*, Wallace).

## HEBOMOIA AUSTRALIS.

Plates 592, figs. 1, 1a, ♂ ♀ (Dry-season Brood).

*Hebomoia Glaucippe*, Moore, Lep. Ceylon, i. p. 127, pl. 49, figs. 1, 1a, ♂ ♀ (Wet-season Brood).  
Swinhoe, Proc. Zool. Soc. 1885, p. 140. Aitken, Journ. Bo. Nat. Hist. Soc. 1887, p. 38.  
Fergusson, Journ. Bo. Nat. Hist. Soc. 1891, p. 444. Betham, Journ. Bo. Nat. Hist. Soc. 1894,  
p. 422. Davidson, Bell and Aitken, Journ. Bo. Nat. Hist. Soc. 1897, p. 572. Aitken and  
Comber, Journ. Bo. Nat. Hist. Soc. 1903, p. 51.

*Hebomoia Australis*, Butler, Ann. Mag. Nat. Hist. 1898, p. 290. Fruhstorfer, Berl. Ent. Zeit. 1894,  
p. 174. Manders, Journ. Bo. Nat. Hist. Soc. 1904, p. 79. Bingham, Fauna of Brit. India,  
Butt. ii. p. 275 (1907).

*Hebomoia Glaucippe Ceylonica*, Fruhstorfer, Iris, 1908, p. 100.

## Wet-season Form.

Male. Upperside creamy-white. *Forewing* with the costal line much narrower than in *Glaucippe*, the orange-red apical patch larger, the outer marginal black band narrower, the black spots smaller, and the inner band nearly obsolete, being represented by a thin sinuous line, or sometimes by a few black scales. *Hindwing* with one, two or three marginal black spear-shaped spots above the middle, and a sub-apical, more or less obscure spot.

Female. Upperside white. *Forewing* with grey irrorations towards the base, the costal line greyish on the basal half, the apical orange patch reduced in size, the marginal black band being broader, the spear-shaped sub-marginal black spots more or less joined together on their outer sides, forming orange spots outside them, the two upper ones being generally complete, the inner band better defined than in the male into a continuous sinuous line thickened hindwards. Underside of both wings much as in *Glaucippe*, but the apical patch of forewing and the coloration of the entire surface of the hindwing darker.

Expanse, ♂ ♀ 4 inches.

## Dry-season Brood.

Male. Upperside white. *Forewing* with the costal line very thin, obscure and often greyish-red tinged towards the base, the orange apical patch with the outer border narrower, the sub-marginal spots quite small, the inner band absent, except for a few black scales at its lower end. *Hindwing* without markings.

Female. Upperside white. *Forewing* with a very few grey scales, almost pure white, the apical orange patch as in the Wet-season form, the sub-marginal spots generally well separated. *Hindwing* with the outer marginal band very narrow, the spots small, discal spots very much reduced in size and mostly round, sometimes obscure. Underside in both sexes as in the Wet-season form.

Expanse, ♂ ♀  $3\frac{2}{10}$  to  $3\frac{8}{10}$  inches.

HABITAT.—Southern India and Ceylon.

DISTRIBUTION.—Taken by us at Khandalla and Malabar Hills, Bombay, where the Dry-season form is very plentiful in October, November and December; we have it also from Calicut, and several Wet-season forms from different parts of Ceylon taken in April, May, June and July. Davidson reports it from the Canara District, Aitken and Comber from the Konkan, Betham from Matheran, and Fergusson from Travancore.

#### HEBOMOIA ROEPSTORFI.

Plate 592, figs. 2, ♂, 2c, ♀ (Wet-season Brood), 2b, ♂, 2a ♀ (Dry-season Brood).

*Hebomoia Roepstorfi*, Wood-Mason, Journ. As. Soc. Beng. 1880, pp. 134, 150 and 235. Wood-Mason and de Nicéville, l.c. 1881, p. 251, pl. 14, figs. 3, 4 and 5, ♂ ♀. Bingham, Fauna of Brit. India, Butt. ii. p. 276, pl. 18, fig. 122 (1907).

Wet-season Brood (Figs. 2, 2c, ♂ ♀).

Male. Upperside. *Forewing* white tinged with sulphur-yellow; the costal line black as in *Australis*, the orange apical patch broader, spreading into the apex of the discoidal cell, the outer black band similar, the inner band complete and more or less even, but usually thin throughout, except at its upper and lower ends where it is slightly thickened, and usually with two indentations at veins 2 and 4, the sub-marginal row of black spots small and nearly round. *Hindwing* white with the yellow tinge deeper, the exterior margin with a thin black band, thickened on the veins. Underside marked as in *Australis*, but the apical patch of the forewings and the entire hindwings suffused with dark ochreous-yellow.

Female. Upperside. *Forewing* white tinged with sulphur-yellow, with the basal portions irrorated with black scales, the black costal margin thicker than in the male, the apical orange patch reduced, the black outer border being broader, the inner border similar, the sub-marginal black spots much larger, spear-shaped, and much nearer to the margin. *Hindwing* white, with the yellow tinge deeper than in the male, almost chrome-yellow in the outer portions in most specimens, the exterior marginal band broader and angled on the veins, the discal row of black spots smaller than in *Australis*, but of similar shape. Underside of both wings similar to the male.

Expanse, ♂ ♀ 4 inches.

Dry-season Brood (Figs. 2b, 2a, ♂ ♀).

Male. Upperside. *Forewing* coloured as in the Wet-season form, the costal margin and orange apical patch similar, except that there is always an orange spot at the lower end of the patch below vein 2, the black inner margin to the patch is generally absent, sometimes faintly indicated, the sub-marginal spots are generally reduced to mere dots. *Hindwing* with the coloration of the Wet-season form, but the band on the exterior border is reduced to a few black spots on the veins and is sometimes entirely absent.



Female. Upperside. *Forewing* coloured as in the Wet-season form, but the black irrorations are more faint, the black costal line is pale towards the base, the orange apical patch is similar, but the sub-marginal spots are much reduced in size, and the inner margin either altogether absent or very faintly indicated. *Hindwing* as in the Wet-season form, but the yellow tinge is usually not so deep. Underside of both wings similar.

Expanse,  $3\frac{8}{10}$  to 4 inches.

HABITAT.—Nikobar and Andaman Islands.

DISTRIBUTION.—We have received the species from the Great Nikobars, from Port Blair and from Aberdeen, Andamans. Bingham records it from Barren Island.

#### INDO-MALAYAN SPECIES.

*Hebomoia Borneensis*, Iphias Glaucippe, var. *Borneensis*, Wallace, Journ. Ent. Soc. 1863, p. 3; id. Trans. Ent. Soc. 1867, p. 396. Druce, Proc. Zool. Soc. 1873, p. 356. Habitat, Borneo.

*Hebomoia Javanensis*, Colicis Glaucippe, Horsfield, Cat. Lep. E.I.C. 1829, p. 130. Iphias Glaucippe, var. *Javanensis*, Wallace, Journ. Ent. Soc. 1863, p. 3. Fruhstorfer, Berl. Ent. Zeit. 1898, p. 174. Habitat, Java.

*Hebomoia Philippensis*, Iphias Glaucippe, var. *Philippensis*, Wallace, Journ. Ent. Soc. 1863, p. 3. Fruhstorfer, Berl. Ent. Zeit. 1898, p. 174. Habitat, Philippines.

*Hebomoia Vossi*, Iphias Vossi, Maitland, Tijl. voor Ent. 1859, p. 25. Vollenhoven, Mon. Pier, p. 55, pl. 6, fig. 4 (1865). Wallace, Trans. Ent. Soc. 1867, p. 397. Fruhstorfer, Berl. Ent. Zeit. 1898, p. 174. Habitat, Nias.

*Hebomoia Sumatrana*, Hagen, Pflanzen. Tierwelt von Deli, Sumatra (1890). *Hebomoia* Glaucippe, var. *Sumatrensis*, Hagen, Iris, 1894, p. 36.

*Hebomoia Liukiuensis*, *Hebomoia* Glaucippe, *Liukiuensis*, Fruhstorfer, Berl. Ent. Zeit. 1898, p. 171. *Hebomoia* Glaucippe, Adolf Fritz, Zool. Jarb. xi. p. 256, pl. 16, figs. 5, 5a, 5b (1898). (*Gynandromorphus*). Habitat, Liukiu Islands, North of Japan.

#### Genus CALLOSUNE.

The *Teracoli* form a little group peculiar to Africa and South-West Asia as far as India and Ceylon, where they represent the Palæarctic genus *Euchloë*. They are very numerous in species, which, though differing much in outward appearance, present few tangible characters by which they can be satisfactorily separated into genera, and hence they have been united into a single genus by Butler, in which he has been followed by Roland Trimen, who formerly treated *Idmais* as distinct. Schatz, however, though admitting the absence of well-marked generic characters, keeps them provisionally separate, because most of the species belonging to each can readily be separated at a glance by their colour and pattern, and he thinks it probable (with which we quite agree) that these differences may be correlated in their early stages. Trimen, while including all the species under the single genus *Teracolus*, divides them into nineteen sections; we prefer to treat the known Indian groups separately, giving the generic characters which mostly apply to all. We omit the genus *Teracolus*, its type being *Subfasciatus*, Swainson, and also *Idmais*, type *Chrysonome*, Klug, no species

of either section occurring within our limits, and the section of which *Faustus*, Olive, is the type we name *Madais*, putting them into three sections: *Callosune*, type *Danaë*, Fabricius; *Colotis*, type *Amata*, Fabricius; and *Madais*, type *Faustus*, Olive; the males of the first section have no sex marks or secondary sexual characters; in *Colotis* the males bear patches of specialized scales or androconia on the upperside of the hindwing; in *Madais* there is a patch of androconia on the underside of the forewing and upperside of hindwing, and the different patterns and coloration form them into well-divided and natural groups.

The species of these genera have been treated in a most arbitrary manner by Watson and Bingham; for the most part the species belong to desert tracts and sandy countries, but some few of them, such as *Callosune Danaë*, are forest and garden insects, their habits of life are quite different to those of the *Dulcis* group which superficially resemble them; the present writer studied these forms in Bombay where *Danaë* is to be found, and for many months in Scind where *Dulcis* and the other desert forms are very plentiful. The male of *Danaë* has habits akin to the *Kallimas* of the family of *Nymphalidæ*, it settles on a leaf on the top of a tree and remains there for days together, making short flights out and returning to the same spot. On one occasion a male of *C. Danaë* in the garden of one of the Bombay hotels was closely watched for six successive days. On the other hand, the different forms of the *Dulcis* groups are most restless creatures, they seem to be perpetually on the move, wandering long distances without settling at all. Then, again, with reference to the seasonal forms we are in a little difficulty; that nearly all the species herein referred to have seasonal forms corresponding to the seasonal forms of the other groups of Lepidoptera there can be no reasonable manner of doubt. It is true that in the desert districts there is very little actual rainfall, but cloudy and clear sky seasons, and hot and cold seasons, come about with the same regularity as wet and dry seasons in the other parts of the Indian region, and these changes affect the *Teracoli* exactly in the same manner; there are some intergrades, but so there are in nearly all the forms of Lepidoptera. Bingham says, "A slight difference in the rainfall from one week to another, probably even from day to day, in localities where they are found, seems to affect the shade of the ground-colour, the width and prominence or otherwise of the markings on their wings"; but he shows no warranty whatever for these assumptions, and does not quote the authority of any one who has observed them in the desert tracts they inhabit. In Proc. Zool. Soc. 1884, p. 434, we stated "the real home of the *Teracoli* is the sandy desert, and it is a most extraordinary fact that the worse the locality, where nature is a barren wilderness of nothing but intense heat and sand, the more beautiful are the species to be found there, many of them having most brilliant patches of golden orange; regular sun patches, just as if these patches had been burnt into their wings by the sun."

*Aphrodite*, Hübner, Verz. bek. Schmett. p. 95 (1816) (preoccupied).

*Callosune*, Doubleday, Gen. Diurn. Lep. i. p. 57 (1847). Moore, Lep. Ceylon, i. p. 128 (1880).

Schatz, Ex. Schmett. ii. p. 72 (1887).

*Colotis*, Bingham (part), Fauna of Brit. India, Butt. ii. p. 259 (1907).

IMAGO.—Orange or crimson tips to the forewings in all the species; no sex marks or secondary sexual characters; wings short, broad. *Forewing* sub-triangular, costa slightly arched, apex almost rounded, exterior margin more or less rounded, costal vein more than half the length of the wing, cell broad; veins 6 and 7 from upper end of cell, 8 absent, 9 from 7 a little above its middle, 10 and 11 emitted at one-fifth and two-fifths before end of cell; upper discocellular short, inwardly oblique, slightly concave, lower deeply concave.

*Hindwing* with the costa much arched, apex rounded evenly with the exterior margin and posterior angle; cell less than half the length of the wing; discocellulars very oblique, upper very short, lower long, outwardly oblique and concave, vein 5 near upper end of cell, 6 from the end, 7 from beyond the middle of cell, 8 much curved; precostal vein long, inclined outwards.

*Antennæ* short, not half the length of the forewing, with an oval flattened club.

PALPI rather long, projecting half beyond the eyes, second joint flat, very laxly pilose beneath, third joint slender, legs very long and slender.

PUPA less boat-shaped than in *Euchloë*, with prominent wing covers.

Type, *C. Danaë*, Fabricius.

#### CALLOSUNE EUCHARIS.

Plate 593, figs. 1, 1a, ♂ ♀ (Wet-season Brood = *Pseudevanthe*), 1b, ♂ (Albino), 1c, ♂, 1d, ♀ (Underside Wet Form), 1e, ♂, 1f, ♀, 1h, ♀ (Dry-season Brood), 1g, ♀ (Albino), 1i, 1j, ♂ ♀ (Extreme Dry-season Brood), 1k, ♂, 1l, ♀ (Underside Extreme Form).

*Papilio Eucharis*, Fabricius, Syst. Ent. p. 472 (1775).

*Anthocharis* (*Callosune*) *Eucharis*, Doubleday, Gen. Diurn. Lep. p. 57 (1847).

*Callosune Eucharis*, Moore, Catal. Lep. E.I.C. i. p. 68 (1857). Wallace, Trans. Ent. Soc. 1867, p. 389. Moore, Lep. Ceylon, i. p. 128, pl. 49, fig. 4, ♂ (1880). Swinhoe, Proc. Zool. Soc. 1885, p. 144. Hampson, Journ. As. Soc. Bengal, 1888, p. 362. Fergusson, Journ. Bo. Nat. Hist. Soc. 1891, p. 444.

*Euchloë Eucharis*, Butler, Catal. Fabr. p. 215 (1869).

*Teracolus Eucharis*, Butler, Proc. Zool. Soc. 1876, p. 161. Swinhoe, Proc. Zool. Soc. 1885, p. 144. Watson, Journ. Bo. Nat. Hist. Soc. 1890, p. 36; id. 1894, p. 522. Butler, Ann. Mag. Nat. Hist. 1897, p. 45. Guy Marshall, Proc. Zool. Soc. 1897, p. 26. de Nicéville, Journ. As. Soc. Bengal, 1899, p. 214. Sharpe, Monograph, Gen. Teracolus, i. p. 97, pl. 31, figs. 1, 1a to 1m (1900). Aitken and Comber, Journ. Bo. Nat. Hist. Soc. 1903, p. 51. Manders, Journ. Bo. Nat. Hist. Soc. 1904, p. 79.

*Colotis Eucharis*, Bingham, Fauna of Brit. India, Butt. ii. p. 268 (1907).

*Papilio Aurora*, Cramer, Pap. Exot. iv. pl. 299, figs. A, B (1782).

*Euchloë Ceneos*, Hübner, Verz. bek. Schmett. p. 94 (1816).



*Pieris Titea*, Godart, Enc. Méth. ix. p. 124 (1819).

*Pontia (Mancipum) Titea*, Horsfield, Cat. Lep. E.I.C. 1829, p. 141.

*Teracolus Titea*, Swinhoe, Proc. Zool. Soc. 1885, p. 144.

*Teracolus Pseudevanthe*, Butler, Proc. Zool. Soc. 1876, p. 164, pl. 7, fig. 16 ♂ ♀. Swinhoe, Proc. Zool. Soc. 1885, p. 144.

*Teracolus Pallens*, Moore, Ann. Mag. Nat. Hist. 1877, p. 49.

#### Wet-season Brood (Figs. 1, 1a, 1c, 1d).

IMAGO.—Male. Upperside white. *Forewing* with the costal line black, a large orange-yellow apical patch, margined on its outer side with a black band, a little narrow in its middle and broadly thickened at its lower end, the inner black margin to the band narrow, thickened somewhat at both ends, indications of a slight shadowy band through the centre of the patch, the black bands meeting at the lower end of the patch fine hindwards to a point almost touching the lower angle of the wing. *Hindwing* with four or five black spots on the exterior margin, on the veins. Underside white. *Forewing* with the orange patch showing through the wing with a band of five or six spots more or less joined together running through its centre. *Hindwing* with a brown spot on the costa a little beyond its middle.

Female. Upperside white, with a few grey scales towards the base. *Forewings* with the orange patch reduced to a band of four, five or six spots, the orange colour much paler than in the male, the black outer and inner bands broad, the inner band recurved, elbowed inwardly before reaching its lower end, where it sometimes stops abruptly, and in some examples is joined to the outer band and narrows hindwards as in the male; a small black spot at the end of the cell. *Hindwings* with the black spots on the exterior margin as in the male, but generally larger. Underside white. *Forewing* with the apical patch showing through the wing, the inner black band well pronounced with a blackish-brown spot below it, immediately below vein 2, also a spot at the end of the cell. *Hindwing* usually tinged with orange-ochreous and covered with ochreous-brown strigæ, sometimes more, sometimes less, a black dot at the end of the cell, a discal irregular brown macular band, angled outwardly below its middle, often broken and incomplete, and brown spots on the veins on the exterior margin. Antennæ, head, thorax and abdomen black, antennæ speckled with white at its sides, head and thorax clothed with short grey brown hairs.

Expanse, ♂ ♀  $1\frac{8}{16}$  inches.

#### Dry-season Brood (Figs. 1e, 1f, 1h = *Eucharis*).

Male. Upperside white. *Forewing* with the costal line paler, the orange-yellow apical patch larger, because the outer black band is narrower and the inner band is altogether absent except for a brown spot above vein 3, and there is no thickening of



the band hindwards. *Hindwing* similar to that of the Wet-season male, but the spots on the exterior margin are reduced to mere dots. Underside white, somewhat tinged with ochreous-yellow. *Forewing* with the orange patch showing through the wing, the inner band of it represented by three or four brown spots downwards from the costa. *Hindwing* unmarked except for a brown spot on the costa beyond the middle.

Female. Rather variable, the orange-yellow apical patch of the *Forewing* is as usual paler than in the male, but more extensive than in the female of the Wet-season form, because both the outer and inner black bands are much narrower and never meet hindwards, and the spots on the outer border of the *Hindwing* are narrower. Underside similar to the underside of the female of the Wet-season form, but the suffusion on the hindwing is of a darker, richer and more reddish tint.

Expanse, ♂ ♀  $1\frac{7}{10}$  to  $1\frac{8}{10}$  inches.

Extreme Dry-season Brood (Figs. 1i, 1j, 1k, 1l = *Pallens*).

Male. Upperside white. *Forewing* with the costal line obsolescent, the orange-yellow apical patch with a thin outer black border, no indications of an inner band. *Hindwing* immaculate. Underside as in the Dry-season form, the suffusion on the hindwing much brighter and more or less tinged with pink.

Expanse, ♂ ♀  $1\frac{6}{10}$  to  $1\frac{7}{10}$  inches.

This species often exhibits albinism. Fig. 1b represents a male of the Wet-season form, and Fig. 1g a female of the Dry-season form.

HABITAT.—Southern India, Ceylon.

DISTRIBUTION.—Frequents cultivated lands and the outskirts of forests; not a desert insect. Fergusson reports it from Travancore, Aitken and Comber from the Konkan, Hampson from the Nilgiri Hills, Davidson from Khandesh, Watson from Mysore, Manders from Ceylon. It is in our Collection from the Nilgiris, Madras, Belgaum, Bombay, Poona and Mahableshwur.

LARVA.—Narrow; much resembles that of a moth, dull green, with no line along the back, but with a yellow or pinkish line along each side. It has an extraordinary habit of resting with the anal segment turned up and not resting on a twig. Feeds on *Candaha Indica*.

PUPA.—Very much bent back, far more so than in *Terias*, the head prolonged into a long thin recurved beak. When first formed it is pale green, but becomes a greyish-white marbled more or less with brown. (Davidson in Sharpe's Monograph Gen. Teracolus, p. 101.)

## CALLOSUNE ETRIDA.

Plate 594, figs. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀ (Wet-season Brood = *Pernotatus*), 1d, ♂, 1e, ♀ (Intermediate Brood), 1f, ♂, 1g, ♀, 1h, ♂, 1i, ♀ (Dry-season Brood), 1j, ♂, 1k, ♀ (Winter Form = *Bimbura*), 1l, ♂, 1m, ♀ (Extreme Dry-season Brood).

*Anthocharis Etrida*, Boisduval, Spéc. Gen. Lep. i. p. 576 (1836).

*Callosune Etrida*, Moore, Cat. Lep. E.I.C. 1857, p. 69. Wallace, Trans. Ent. Soc. 1867, p. 390. Swinhoe, Journ. Bo. Nat. Hist. Soc. 1887, p. 278. Hampson, Journ. As. Soc. Bengal, 1888, p. 362. Mackinnon and de Nicéville, Journ. Bo. Nat. Hist. Soc. 1898, p. 591.

*Teracolus Etrida*, Butler, Proc. Zool. Soc. 1870, p. 726; id. 1876, p. 160. Swinhoe, Proc. Zool. Soc. 1884, p. 510; id. 1885, p. 144. Aitken, Journ. Bo. Nat. Hist. Soc. 1887, p. 38. Watson, Journ. Bo. Nat. Hist. Soc. 1890, p. 36; id. 1894, p. 522. Davidson, Bell and Aitken, Journ. Bo. Nat. Hist. Soc. 1890, p. 359; id. 1897, p. 572. de Nicéville, Journ. Bo. Nat. Hist. Soc. 1890, p. 359. Guy Marshall (part), Proc. Zool. Soc. 1897, p. 144. Butler, Ann. Mag. Nat. Hist. 1897, p. 456. Mackinnon and de Nicéville, Journ. Bo. Nat. Hist. Soc. 1898, p. 591. Sharpe, Monograph, Gen. Teracolus, i. p. 104, pl. 33, figs. 1, 1a to 1m (1898). Nurse, Journ. Bo. Nat. Hist. Soc. 1899, p. 513. de Rhé-Philipe, Journ. Bo. Nat. Hist. Soc. 1902, p. 492. Aitken and Comber, Journ. Bo. Nat. Hist. Soc. 1903, p. 51.

*Colotis Etrida*, Bingham, Fauna of Brit. India, Butt. ii. p. 270 (1907).

*Teracolus Pernotatus*, Butler, Proc. Zool. Soc. 1876, p. 159, pl. 7, fig. 1, ♂ ♀.

*Teracolus Farrinus*, Butler, l.c. fig. 2, ♂ ♀; id. 1886, p. 373.

*Callosune Farrina*, Moore, Proc. Zool. Soc. 1882, p. 254.

*Teracolus Purus*, Butler, l.c. p. 370, figs. 14, ♂, 15, ♀; id. 1881, p. 610; id. 1886, p. 374; id. Ann. Mag. Nat. Hist. 1888, p. 200.

*Callosune Pura*, Moore, Proc. Zool. Soc. 1882, p. 254.

*Teracolus Casimirus*, Butler, l.c. fig. 5, ♂ ♀.

*Teracolus Bimbura*, Butler, l.c. figs. 3, 4, ♂ ♀; id. 1881, p. 609. Swinhoe, Proc. Zool. Soc. 1884 p. 511; id. 1885, p. 144; id. 1886, p. 433.

Wet-season Brood (Figs. 1, 1a, 1b, 1c, ♂ ♀).

IMAGO.—Male. Upperside white, the basal portion irrorated with grey scales. *Forewing* with the costal line blackish, a black dot at the end of the cell, an orange-red apical patch divided by the black veins, much narrower than in *Eucharis*, being broadly bordered on both sides with black, the bands meeting hindwards and narrowing to a point on the lower angle of the wing. *Hindwing* with a blackish spot on the costa beyond the middle, and large black angulated spots on the veins on the outer border, the discal band of the underside showing through the wing. Underside white. *Forewing* with the cell spot more pronounced, the orange patch showing through the wing, bordered inwardly by a well-marked broad band from the costa, usually extending only to vein 4. *Hindwing* with a black dot at the end of the cell, generally with a pinkish mark on its inner side, and a discal brown macular whorl, often dislocated, the outer marginal spots often showing through the wing. *Antennæ* blackish-brown, with

white bands above, whitish beneath. Head, thorax and abdomen black above, with short greyish hairs, white beneath. Palpi black above, white beneath.

Female. Upperside white, more densely irrorated with grey scales, all the markings darker and larger. *Forewing* with the cell spot often fairly large, the orange at the apex much reduced, the black bands being much deeper, a discal row of black spots, generally three, two large ones below veins 4 and 2 and a small one between them. *Hindwing* with two black spots from the costa beyond the middle, the whorl completed with fainter coloured spots, the black marginal spots larger than in the male. Underside as in the male, but there is a discal macular band or whorl of spots on both wings, often incomplete on the forewing.

Expanse, ♂ ♀  $1\frac{8}{10}$  inches.

Intermediate Brood (Figs. 1d, 1e, ♂ ♀ = *Farrinus*).

Male. Upperside white, the grey scaling less. *Forewing* with the orange patch larger, the black border being narrower. *Hindwing* with the spots on the exterior margin smaller, the discal band not visible. Underside as in the Wet-season form, but all the markings paler.

Female. Upperside as in the Wet-season form, with all the markings reduced, the discal band on the forewing composed of only two spots, the cell spot reduced to a dot. *Hindwing* with the spots on the exterior margin smaller, a large spot below the costa beyond the middle, the rest of the discal band not visible. Underside as in the Wet-season form, but all the markings paler.

Expanse, ♂ ♀  $1\frac{7}{10}$  to  $1\frac{8}{10}$  inches.

Dry-season Brood (Figs. 1f, 1g, 1h, 1i, ♂ ♀ = *Etrida*).

Male. Usually smaller than the preceding and whiter. *Forewing* with the orange-red apical patch larger, the black bands narrower and not extended hindwards to the angle. *Hindwing* with the black spots on the exterior margin much reduced in size. Underside white. *Forewing* with a dot at the end of the cell, the orange patch showing through the wing, margined inwardly by a pale blackish bar from the costa, usually ending before reaching vein 4. *Hindwing* sometimes slightly tinged with reddish-ochreous, a dot at the end of the cell, indications more or less pronounced of the discal whorl, generally dislocated and incomplete, sometimes absent (= *Purus*).

Female. Like the male, but on the upperside of the forewing the spot at the end of the cell is larger. There is usually a spot in the disc below vein 4 and another below vein 2; sometimes one or other of these spots is absent. *Hindwing* with the spots on the exterior margin much as in the Intermediate form. Underside. *Forewing* white, the apical patch showing through the wing, a spot at the end of the cell, and two discal spots. *Hindwing* generally with a slight pinkish tinge, a dot at the end of the cell;

sometimes indications of the discal whorl, often not visible, sometimes with indications of the marginal spots, sometimes without them.

Expanse, ♂ ♀  $1\frac{6}{10}$  to  $1\frac{7}{10}$  inches.

Winter Form (Figs. 1j, 1k = *Bimbura*).

Only differs from the Dry-season form in having the underside of the hindwings in both sexes suffused with pink, usually very strongly suffused when first emerged, when at rest the greater portion of the forewing is hidden by the hindwing. The creature goes to rest on the tops of the bushes, the leaves of which are pink-tinged at their ends, and thus becomes invisible. We have often watched them settling in this manner of an evening.

Extreme Dry-season Form (Figs. 1l to 1m).

Male. Upperside pure white, the apical patch as in the Dry-season form. *Hind-wing* with the spots on the exterior border reduced to dots, often absent. Underside sometimes with both wings pure white, sometimes the hindwing is slightly tinged with pink, generally a minute dot at the end of each cell, some of the usual spots occasionally indicated, often the wings are immaculate, some of the examples are very small.

Expanse, ♂ ♀  $1\frac{1}{10}$  to  $1\frac{3}{10}$  inches.

LARVA.—Nearly cylindrical, slender, and of a uniform green colour, with the rough surface characteristic of *Catopsilia* and *Terias*.

PUPA.—With a sharp transverse ridge above, at the junction of the thorax and abdomen, which extends well beyond the general outline on each side, forming a pointed lateral process; from this a dorsal ridge runs out into a similar point just over and behind the head; the colour is light green, with a triangular patch of yellowish-white on the anterior side of each lateral process, and a similar patch covering the top of the head. Aitken (Journ. Bo. Nat. Hist. Soc. 1887, p. 38.)

HABITAT.—All India except Bengal.

DISTRIBUTION.—It is to be found in the desert and sandy tracts as well as in cultivated land and the outskirts of forests. We have the species from Campbellpur, Deesa, Neemuch, Rawul Pindi, Mhow, Ahmedabad, Nilgiris, from many localities in the Bombay district, and from Sind right up to Sukkur; de Nicéville reports it from Simla and Agra; Davidson from Kanara and Khandesh, and it is in the British Museum from Mean Meer and Cashmir. It is very curious that its capture seems never to have been reported from any part of Bengal Proper.



## CALLOSUNE LIMBATA.

Plate 595, figs. 1, ♂, 1a, ♀ (Wet-season Form).

*Teracolus Limbatus*, Butler, Proc. Zool. Soc. 1876, p. 161. Watson, Journ. Bo. Nat. Hist. Soc. 1894, p. 522. Butler, Ann. Mag. Nat. Hist. 1897, p. 456. Sharpe, Mon. Gen. Teracolus, i. p. 110, pl. 34, figs. 1, 1a to 1g (1898).

*Callosune Limbatus*, Moore, Lep. Ceylon, i. p. 129, pl. 49, fig. 5 (1881).

*Colotis Limbatus*, Bingham, Fauna of Brit. India, Butt. ii. p. 271 (1907).

*Teracolus Etrida*, Guy Marshall (part), Proc. Zool. Soc. 1897, p. 26.

## Wet-season Brood.

IMAGO.—Male. Upperside white, with basal portion irrorated with grey scales. *Forewing* costal line black, orange-red apical patch divided by the veins, the outer and inner black borders broad, meeting thickly together hindwards to the lower angle of the wing. *Hindwing* with a broad continuous black marginal band, in some examples diffused inwards, in others without the diffusion, and sometimes the band is composed of large black spots joined together. Underside much as in the Wet-season form of *Etrida*.

Female. Upperside very similar to the male. *Forewing* with a small black spot at the end of the cell, and the two usual discal spots, these are sometimes very small and sometimes absent. *Hindwing* with the outer black band much as in the male, a small black spot below the costa beyond its middle. Underside white, the costal margin, basal area, apical patch, and hind margin greenish-yellow, of various shades in different examples; the markings as in *Etrida*.

Expanse, ♂ ♀  $1\frac{5}{10}$  to  $1\frac{6}{10}$  inches.

## Dry-season Brood.

Male. Upperside white, the grey irrorations less than in the Wet-season form. *Forewing* with the costal line paler, the orange apical patch a little larger, the black bands on each side being narrower, the inner band narrowing upwards, the two bands meeting hindwards and fining down to a line on the lower angle of the wing. *Hindwing* with black marginal spots as in *Etrida*. Underside white tinted with pale yellowish towards the base of both wings, the apical patch of the forewing showing through the wing, a black spot at the end of each cell, largest on the hindwing and touched with pink, the wing otherwise immaculate.

Female very similar to the male. *Forewing* with a black dot at the end of the cell, and one, sometimes two, black discal dots. Underside like the underside of a Dry-season form female *Etrida*.

Expanse, ♂ ♀  $1\frac{4}{10}$  to  $1\frac{5}{10}$  inches.

HABITAT.—Ceylon.

DISTRIBUTION.—We have it from Trincomali, it is in the British Museum from Puttalam, Hambantotte, and Vavoniya Vilankulam.

## CALLOSUNE DANAË.

Plate 595, figs. 2, ♂, 2a, ♀, 2b, ♂, 2c, ♀ (Wet-season Brood), 3, ♂, 3a, ♀ (Dry-season Brood = *Sanguinalis*), 4, ♂, 4a, ♀, 4b, ♂, 4c, ♀ (Extreme Dry-season Brood = *Taplini*).

*Papilio Danaë*, Fabricius, Syst. Ent. p. 476 (1775). Donovan, Ins. Ind. pl. 26, fig. 2, ♂ (1800).

*Callosune Danaë*, Moore, Catal. Lep. E.I.C. i. p. 69 (1857). Wallace, Trans. Ent. Soc. 1867, p. 389.

Moore, Lep. Ceylon, i. p. 129 (1881). Hampson, Journ. As. Soc. Bengal, 1888, p. 362.

*Teracolus Danaë*, Butler, Proc. Zool. Soc. 1876, p. 157. Swinhoe, Proc. Zool. Soc. 1885, p. 143.

Watson, Journ. Bo. Nat. Hist. Soc. 1890, p. 36; id. (part) 1894, p. 521. Butler, Ann. Mag.

Nat. Hist. 1897, p. 498. Guy Marshall (part), Proc. Zool. Soc. 1897, p. 22. Aitken and

Comber, Journ. Bo. Nat. Hist. Soc. 1903, p. 51.

*Colotis Danaë*, Bingham (part), Fauna of Brit. India, Butt. ii. p. 271 (1907).

*Teracolus Sanguinalis*, Butler, Proc. Zool. Soc. 1876, p. 158.

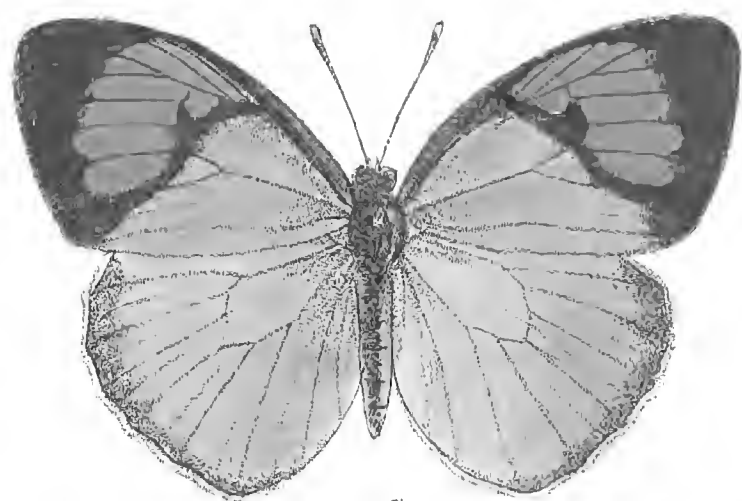
*Callosune Sanguinalis*, Moore, Lep. Ceylon, i. p. 129 (1881).

*Callosune Taplini*, Swinhoe, Proc. Zool. Soc. 1884, p. 444, pl. 40, figs. 8, ♂, 9, ♀; id. 1885, p. 144.

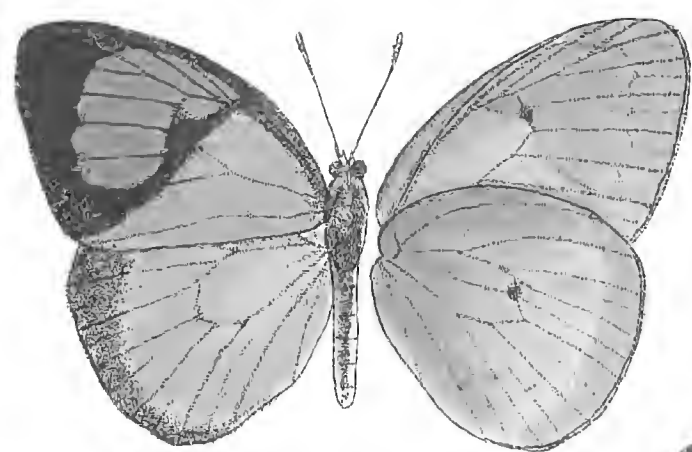
Wet-season Form (Figs. 2, ♂, 2a, ♀, 2b, ♂, 2c, ♀).

IMAGO.—Male. White, rather thickly irrorated with blackish-grey scales towards the base. *Forewing*, costa from base to the apical patch with a broad black band, a black spot at the end of the cell; apical patch large, carmine, edged on the costa and outer side by a narrow black band, the outer band with angular spots on the veins; the inner black band is broad, is somewhat suffused inwardly and widens hindward, and is continued to the lower angle of the wing. *Hindwing* with a broad black band on the exterior margin, more or less macular hindwards. Underside white, sparsely covered with grey scales. *Forewing* with a black spot at the end of the cell, the apical portion with pale rosy tinge, a band of pale carmine across its middle containing a whorl of black spots with white centres, some grey marks on the outer margin, followed by two large blackish square spots on the interspaces below veins 3 and 2. *Hindwing* with a black spot with a carmine centre at the end of the cell, a discal macular complete band or whorl right across the wing, the spots decreasing in size hindward, and each containing faint traces of pale carmine inside them, the outer black border faintly visible through the wing.

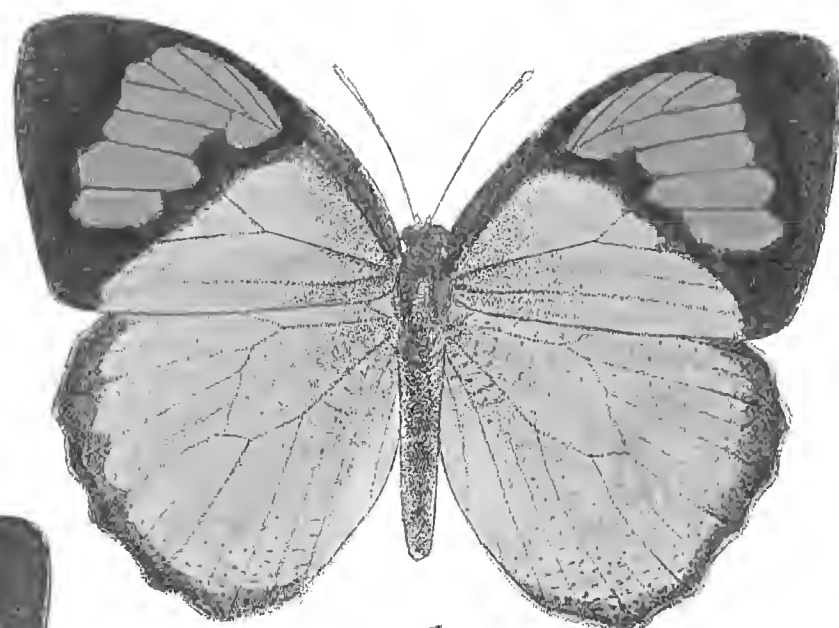
Female. Upperside white, with the basal third very thickly irrorated with blackish-grey scales, a black spot at the end of the cell, costal line black, the apical patch very nearly as brightly coloured as in the male, but smaller, its outer and inner black margins being deeper, the former running in acute angles inwards on the veins, the inner band thickened hindwards and continued broadly to the lower angle, a whorl of four or five black spots across the middle of the patch. *Hindwing* with a broad black band on the exterior border as in the male, a square black spot near the costa beyond the middle, being the commencement of the discal macular band, the spots of which are less pronounced hindwards. Underside like the underside of the male, but



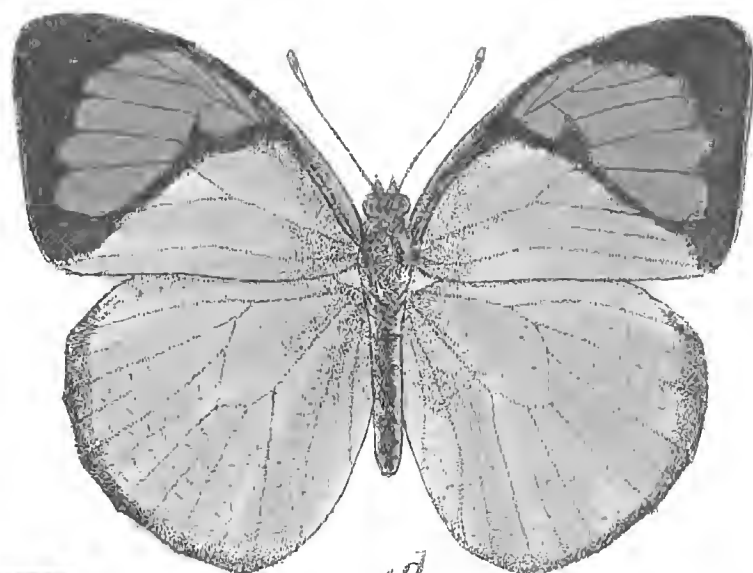
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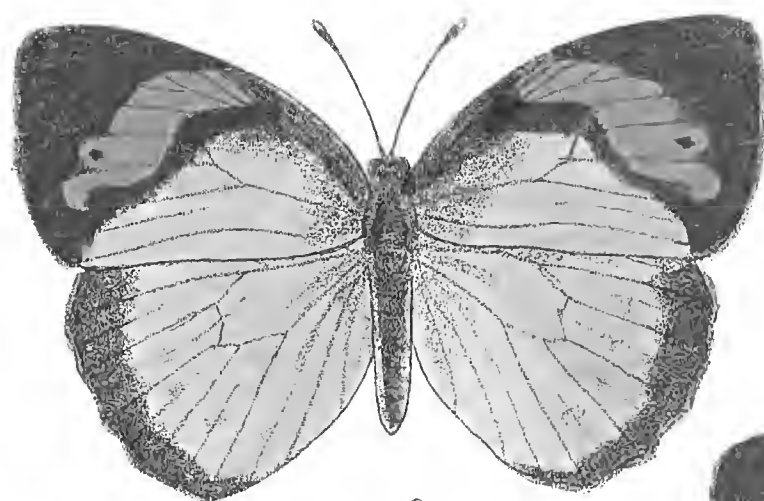
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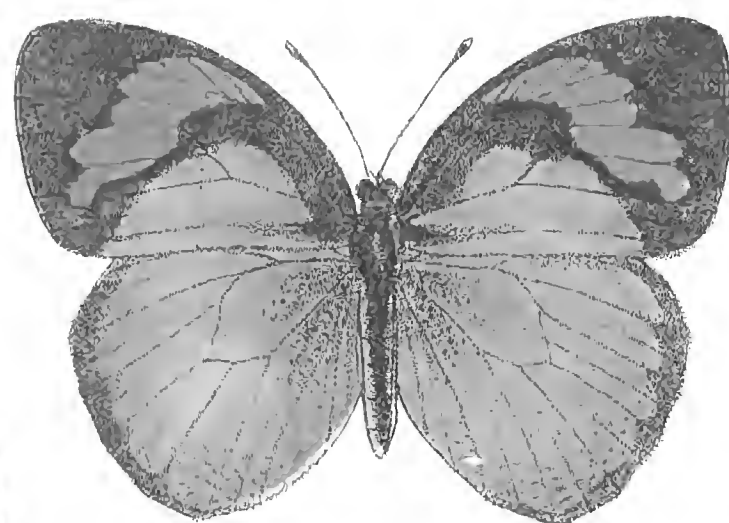
1<sup>b</sup>



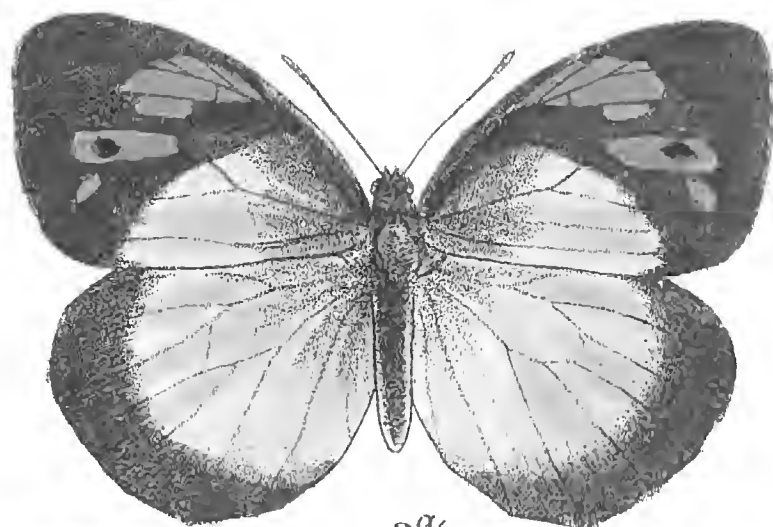
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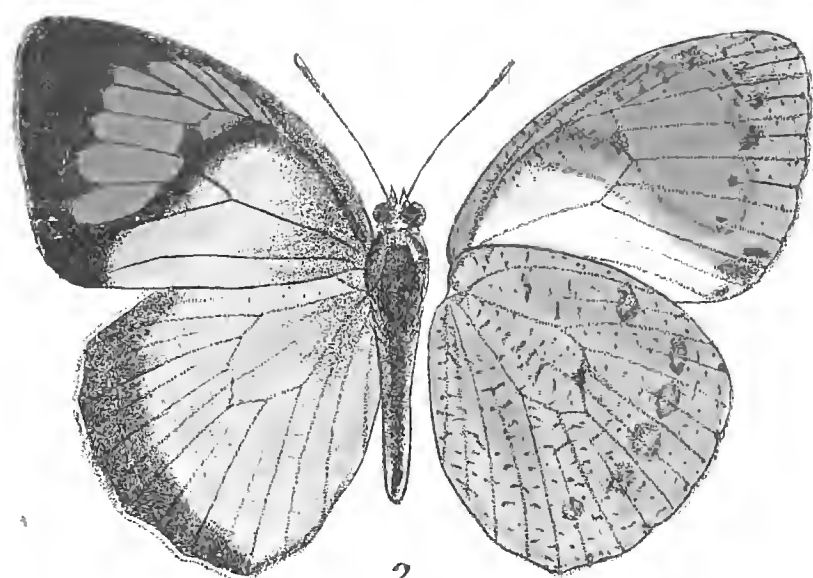
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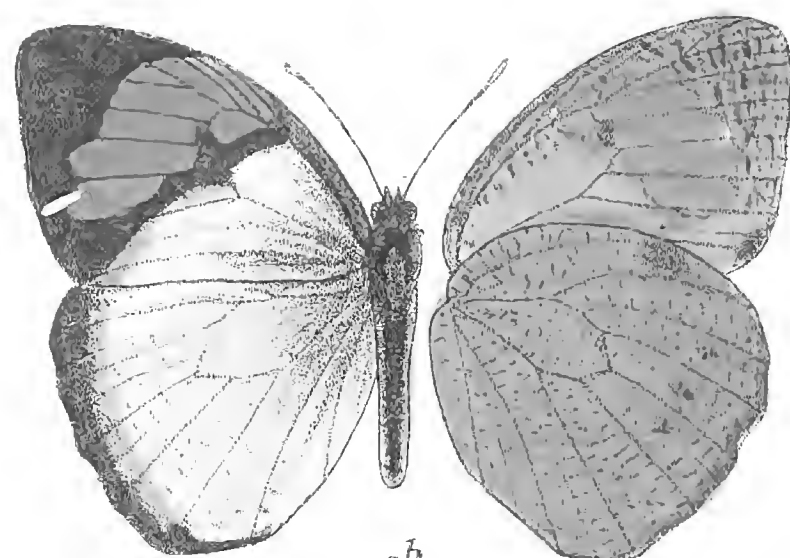
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2<sup>a</sup>



2



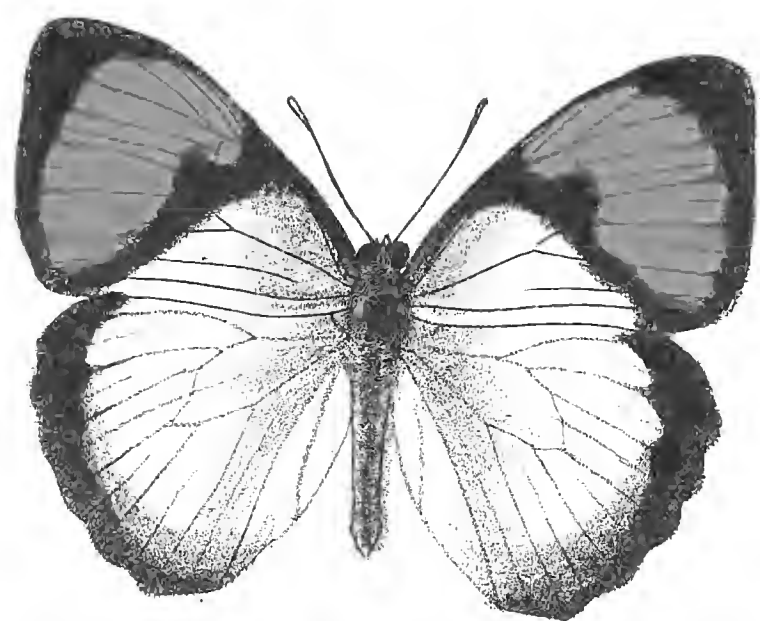
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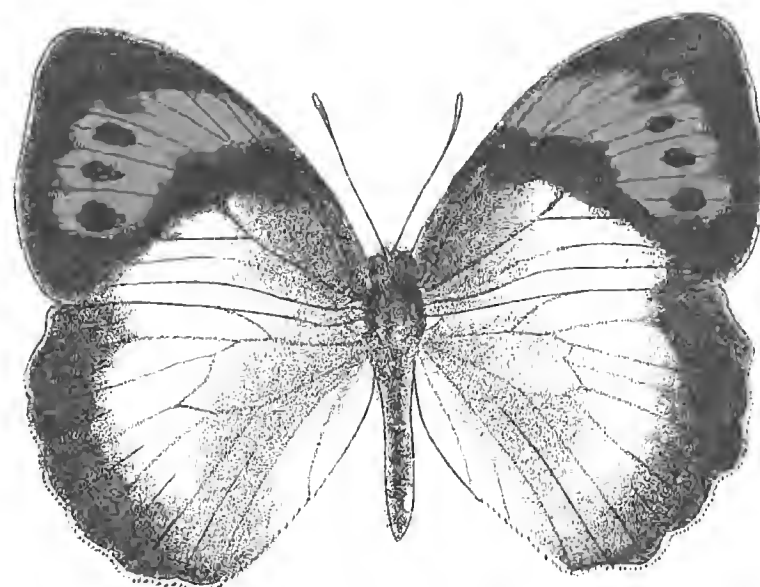
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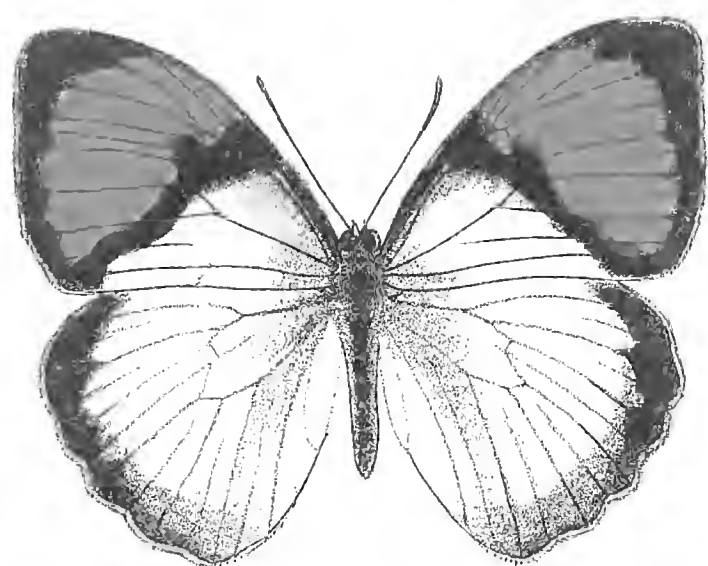




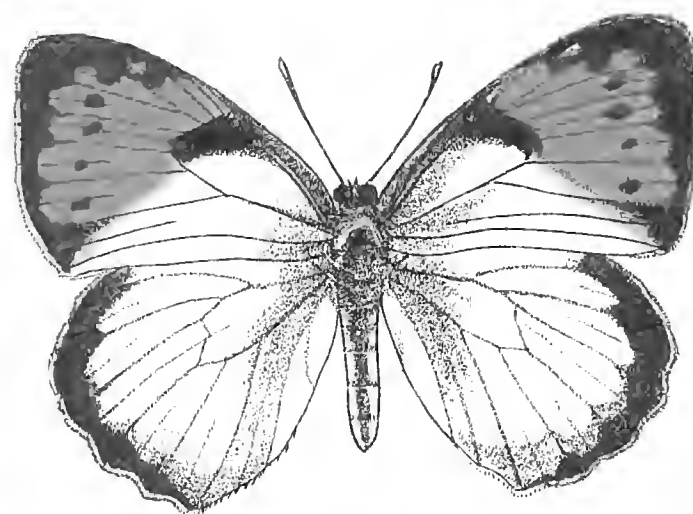
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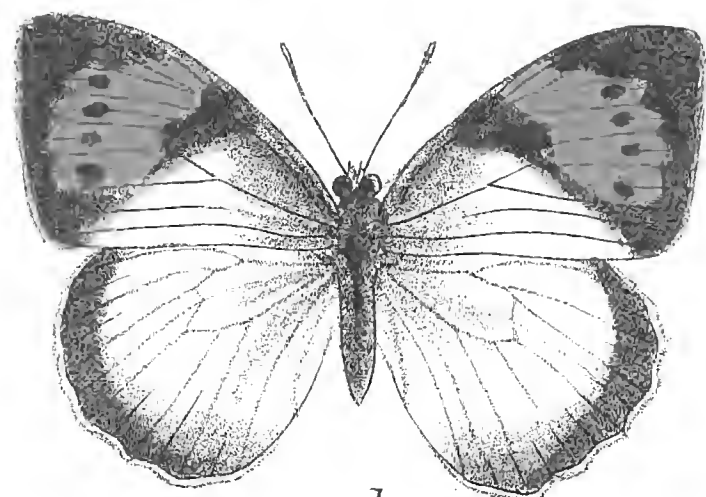
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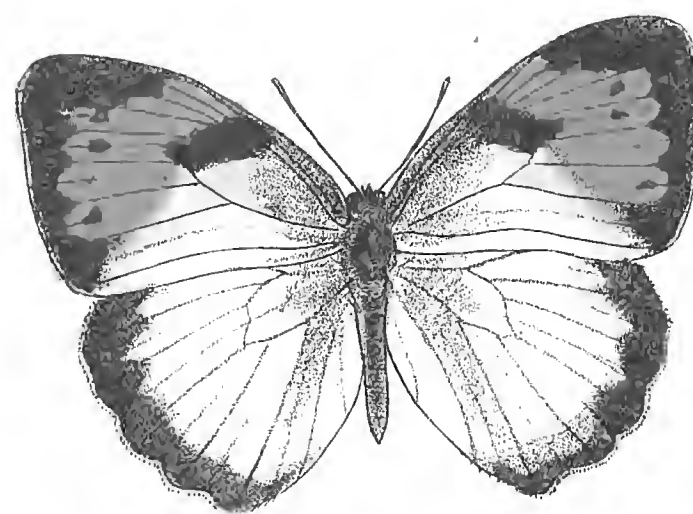
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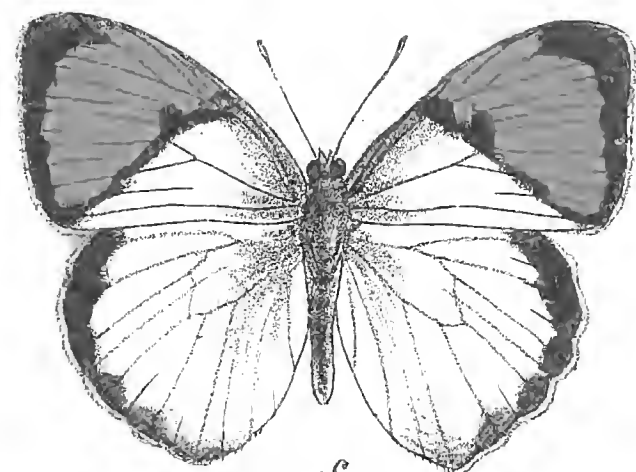
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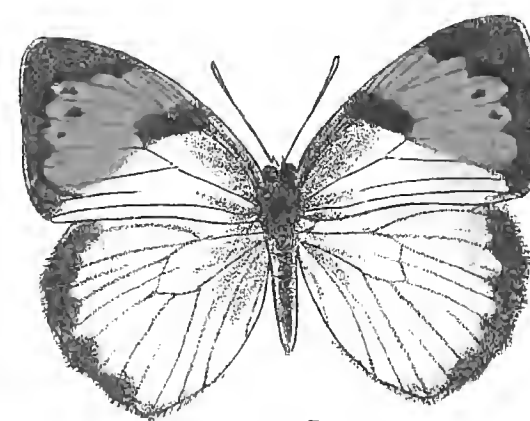
1<sup>d</sup>



1<sup>e</sup>



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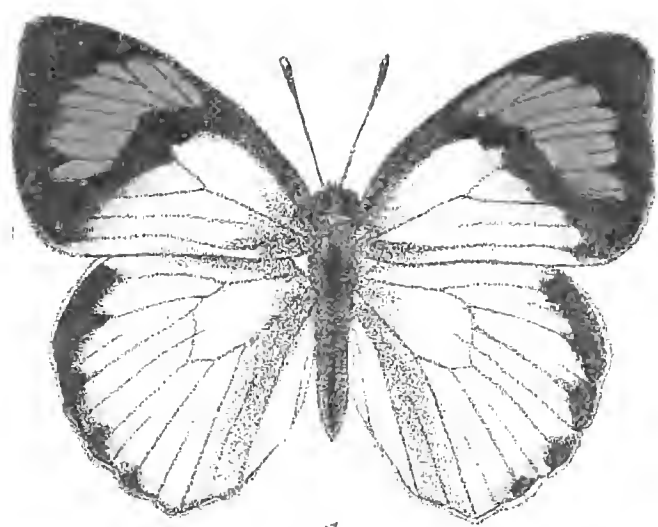


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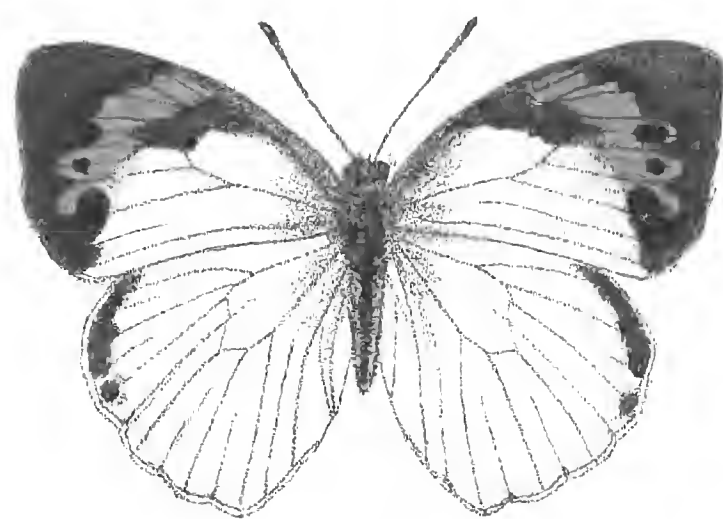
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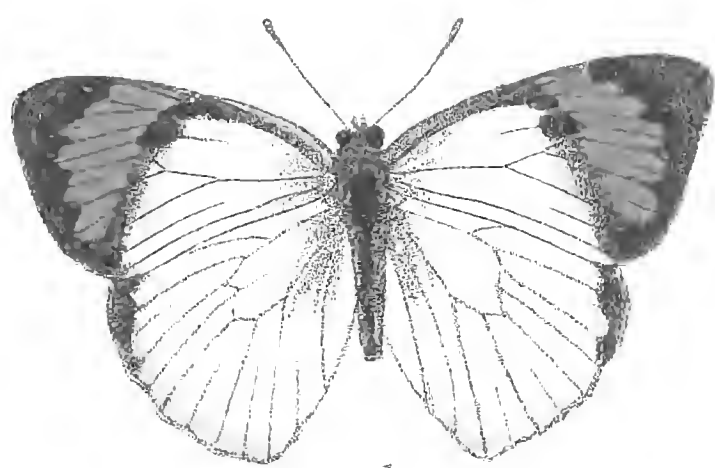




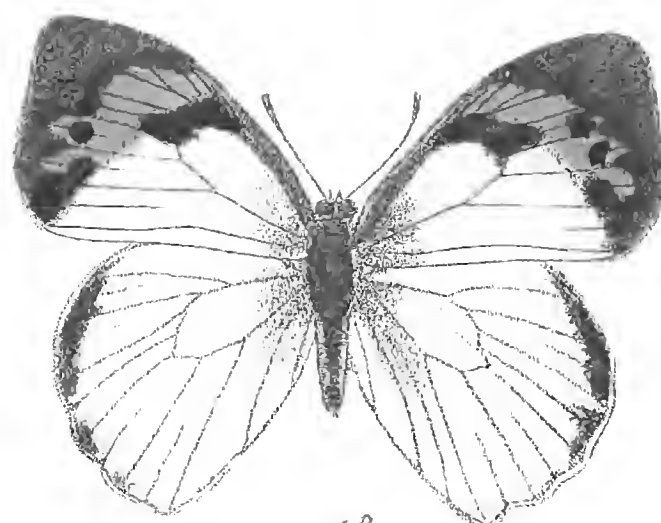
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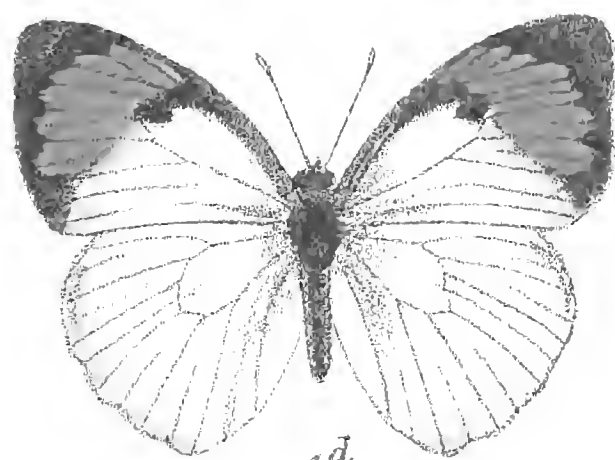
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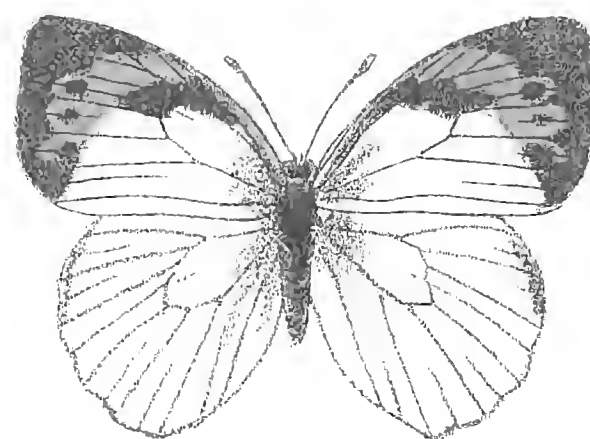
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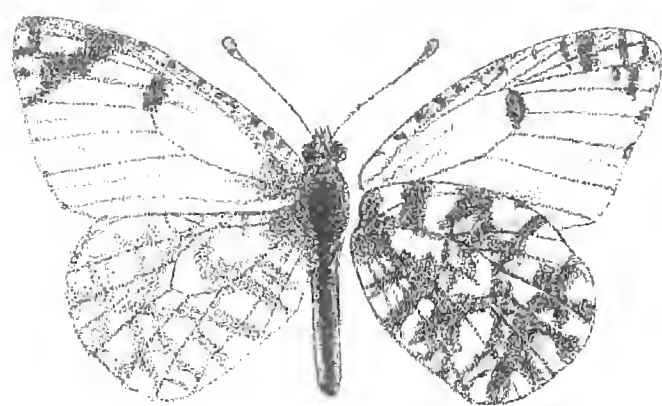
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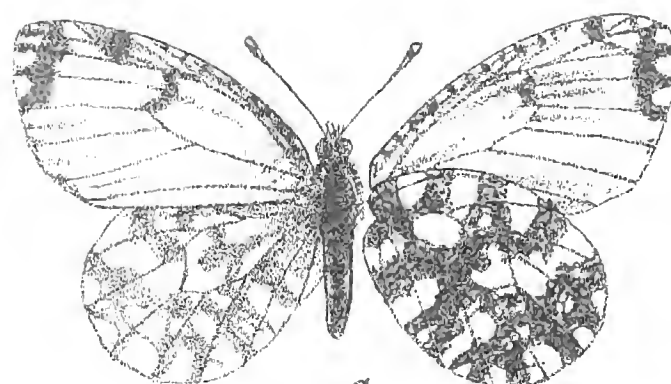
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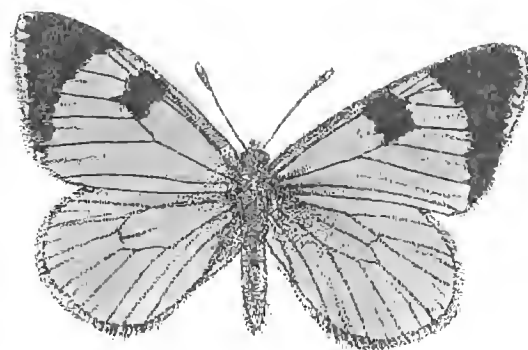
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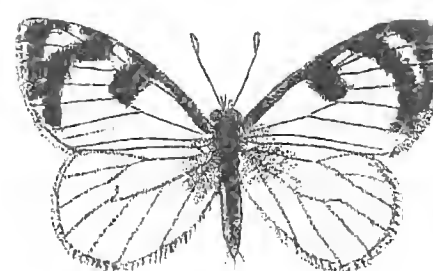
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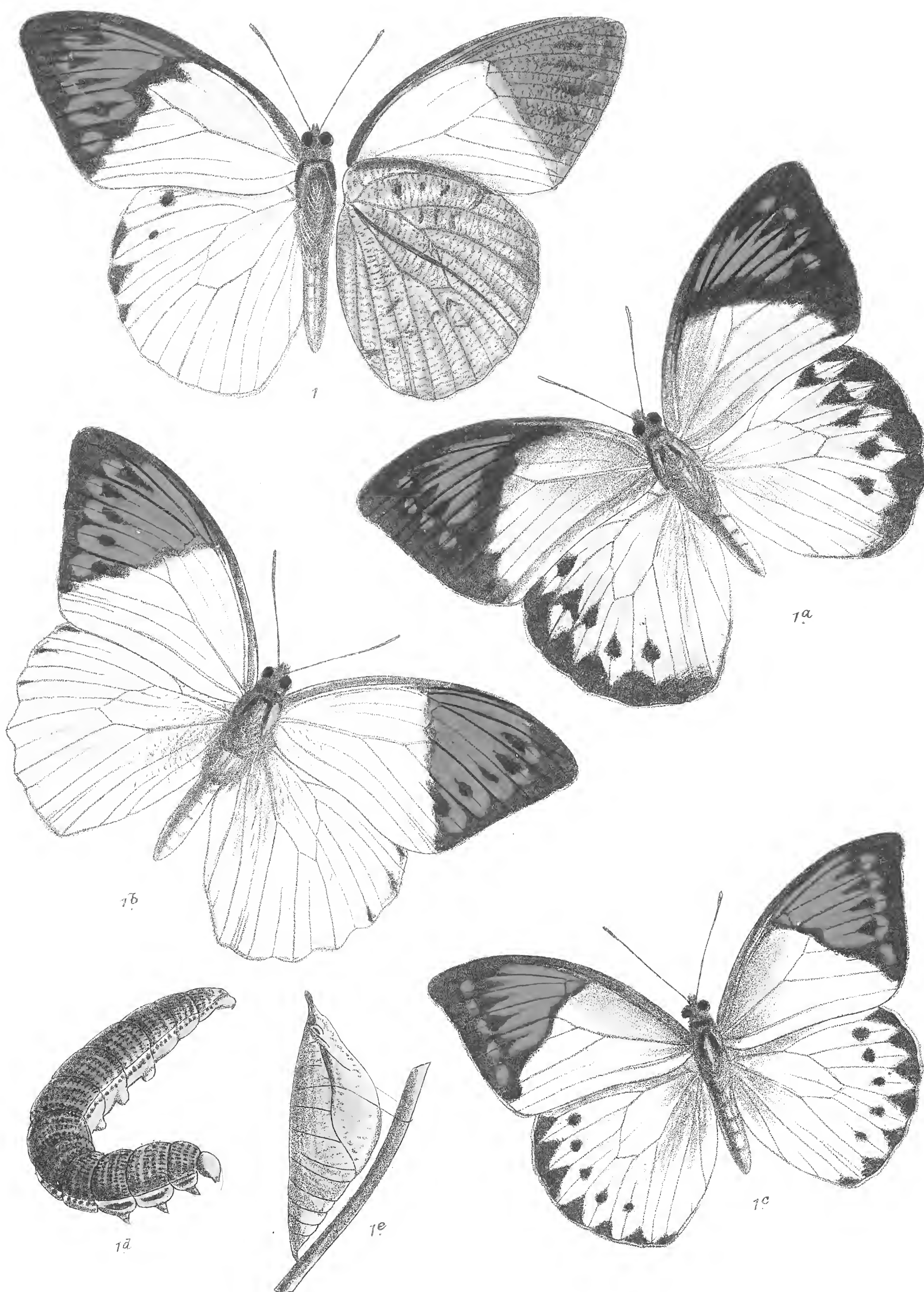
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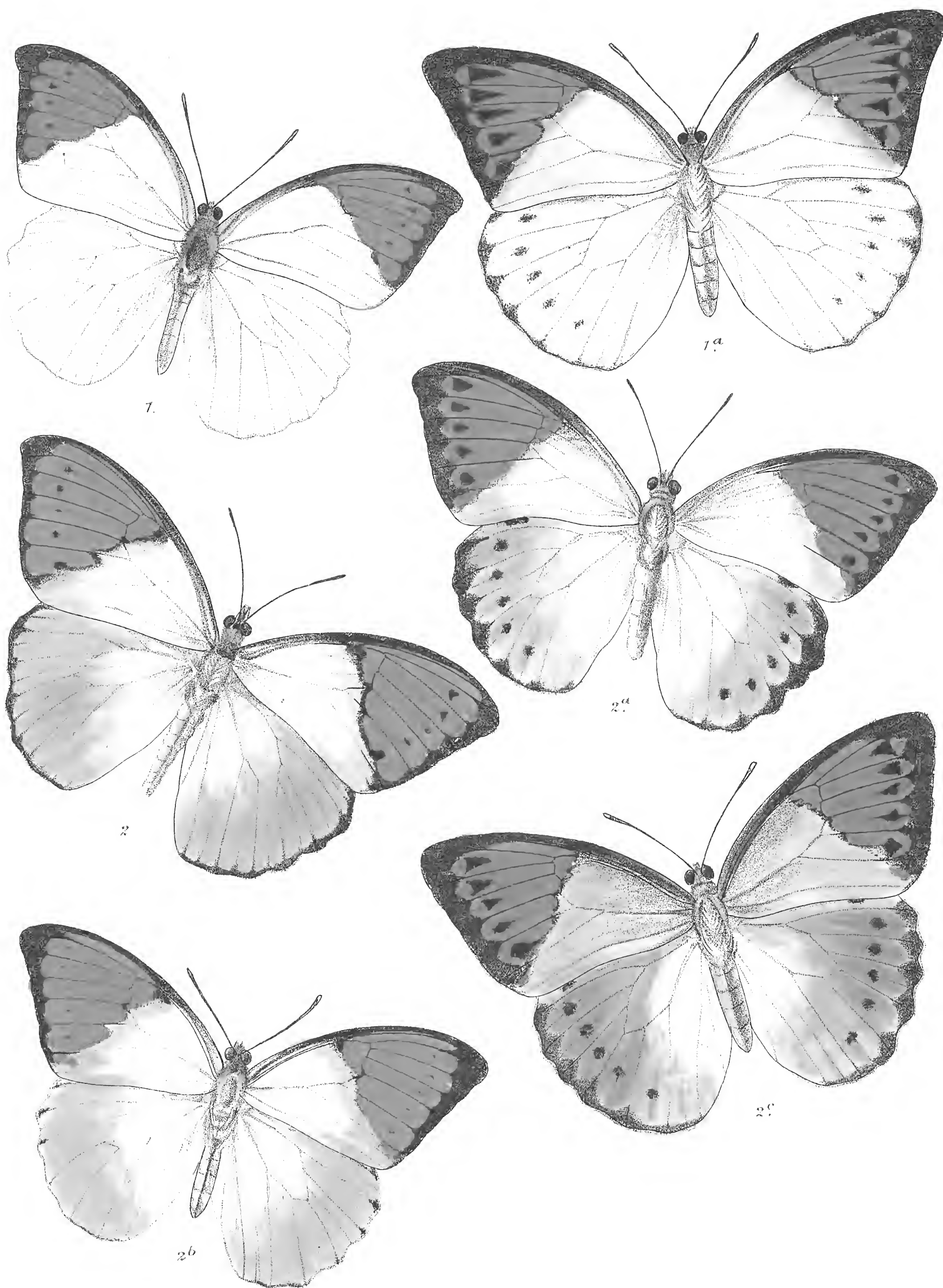


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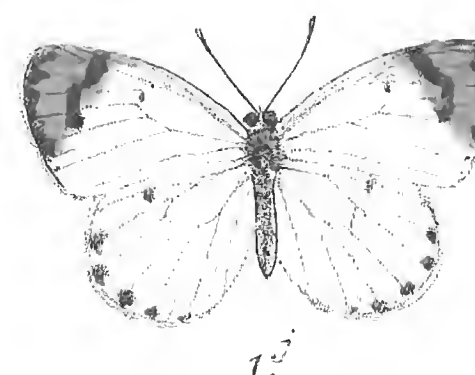
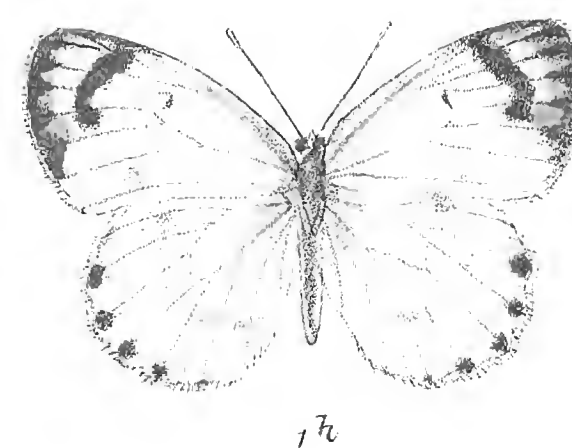
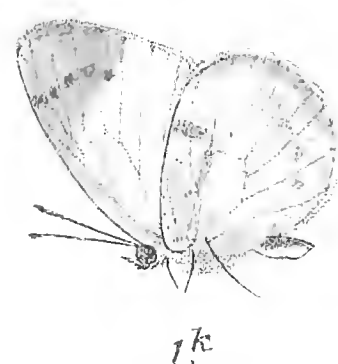
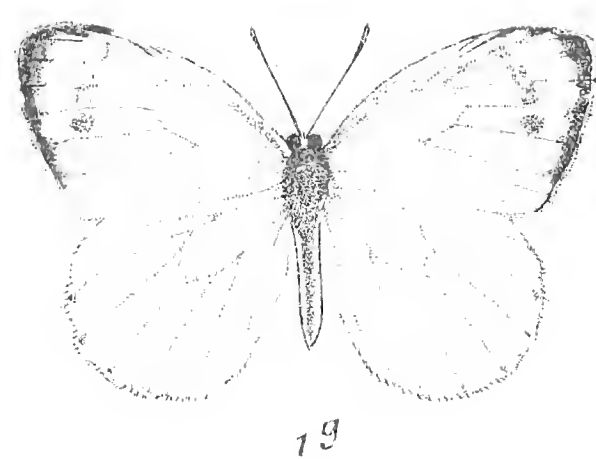
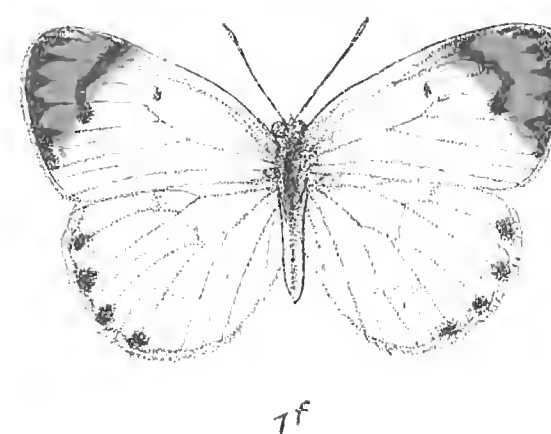
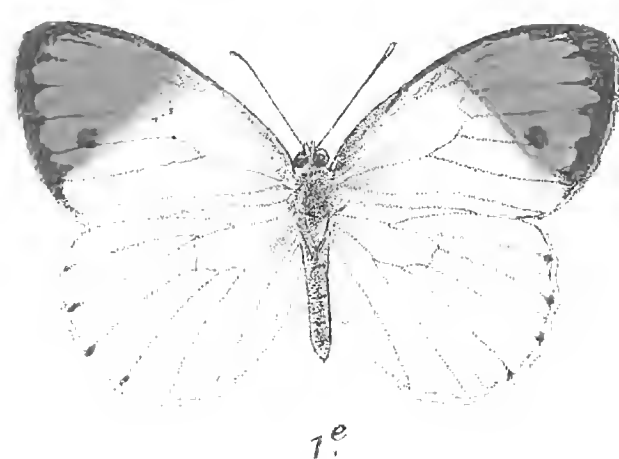
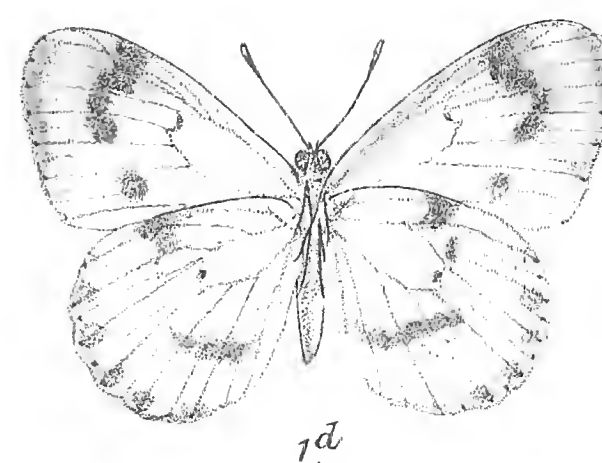
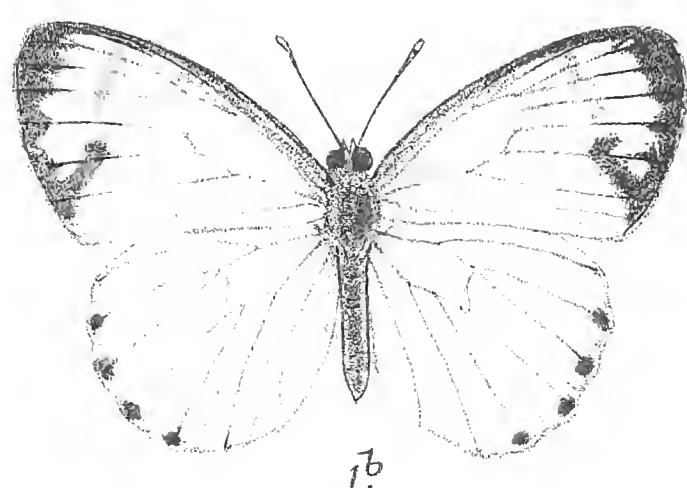
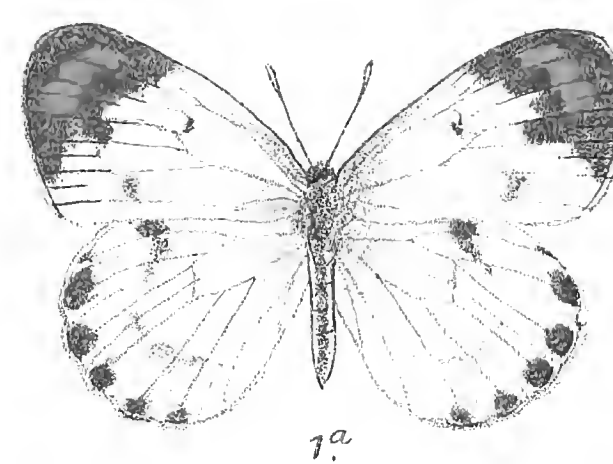
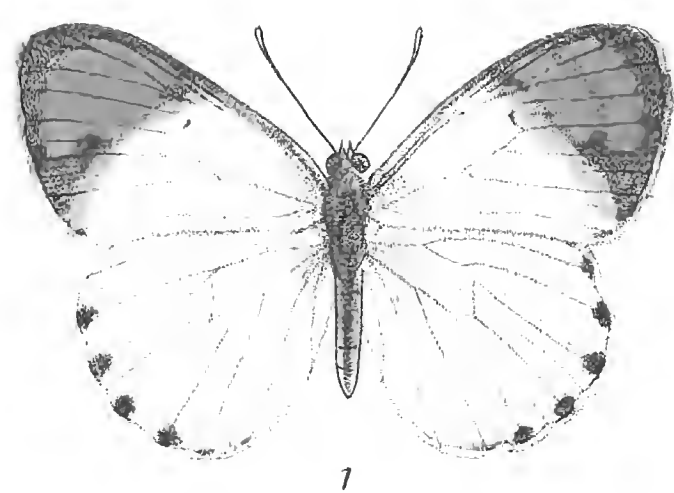
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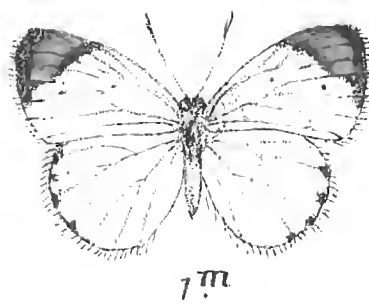
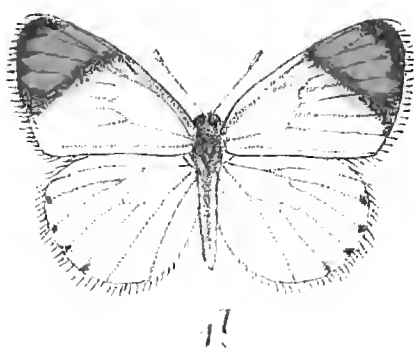
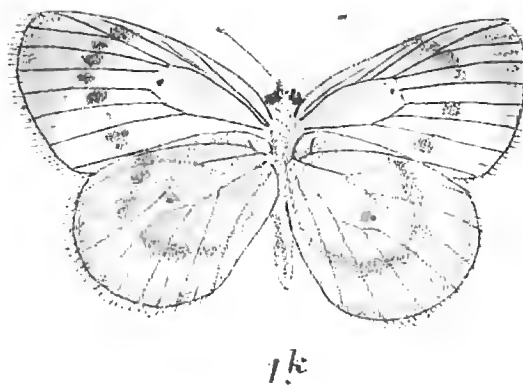
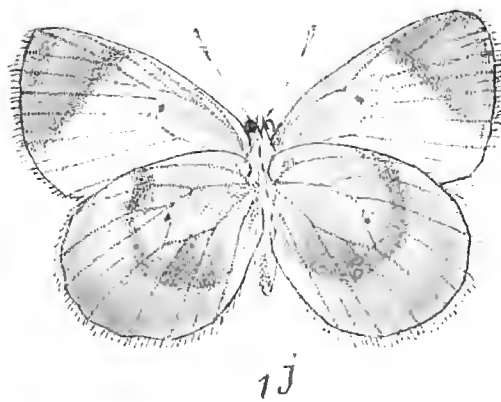
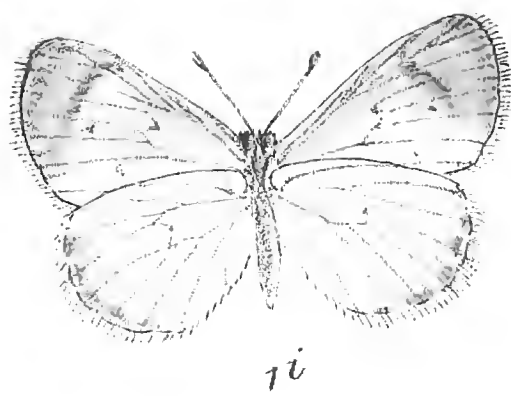
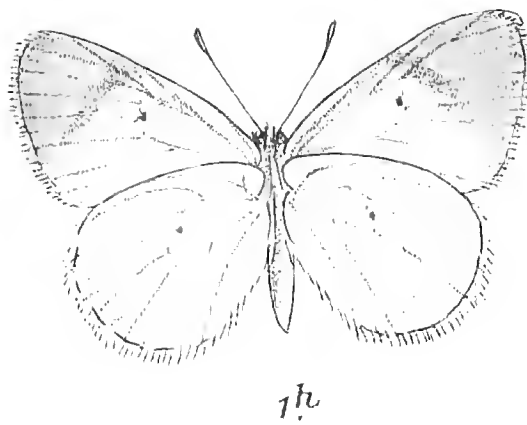
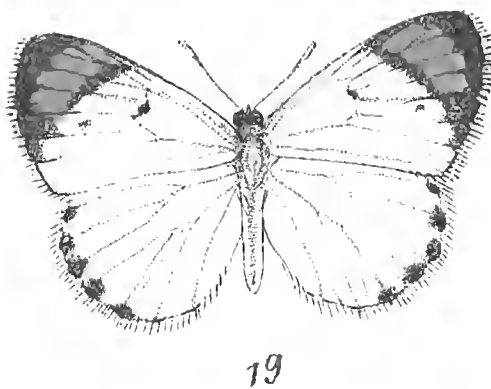
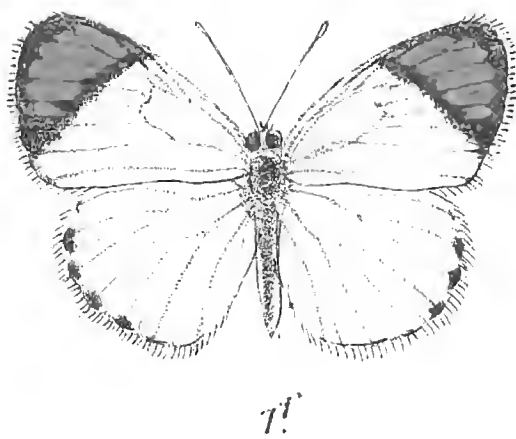
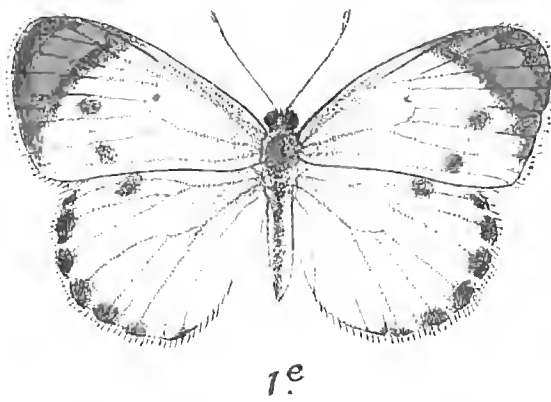
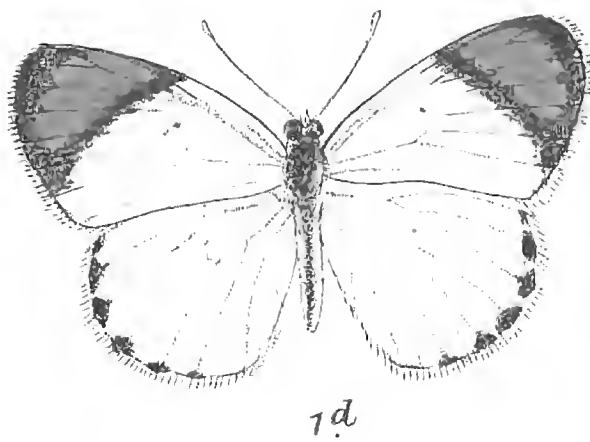
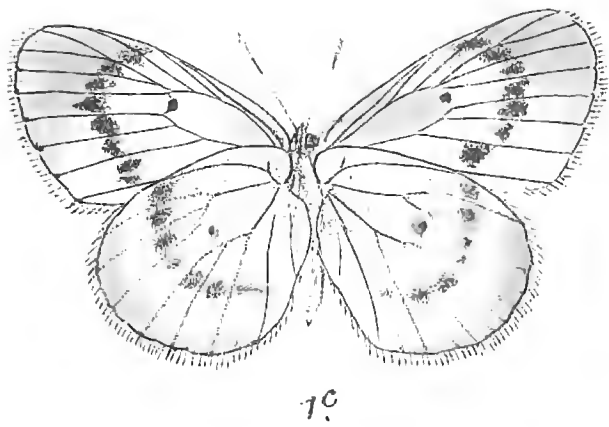
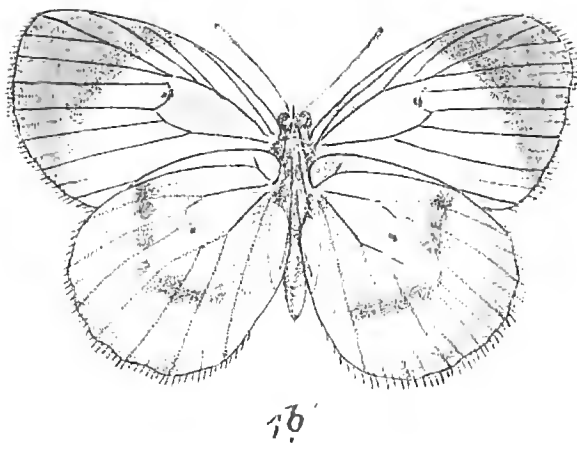
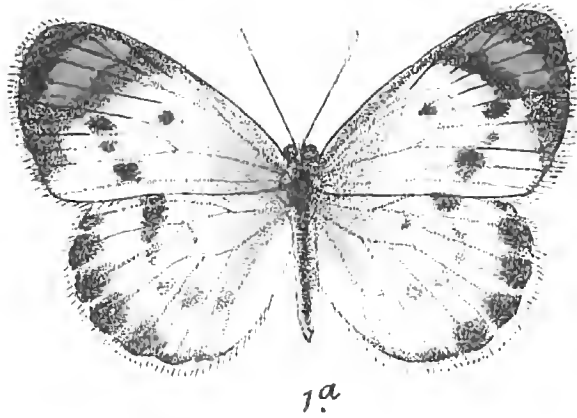
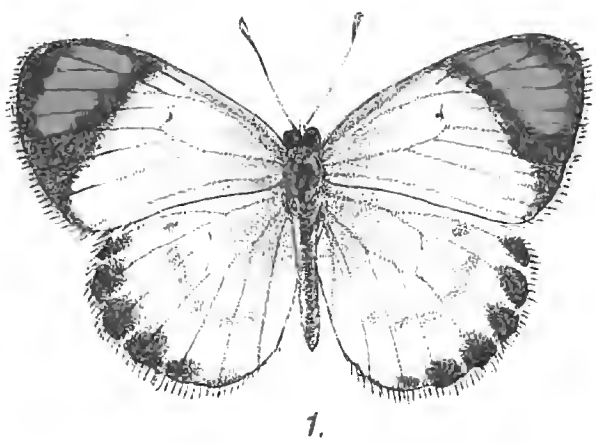




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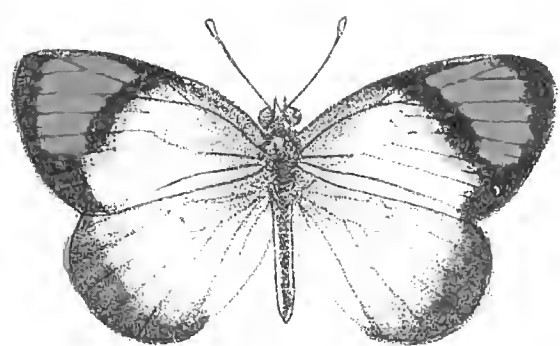


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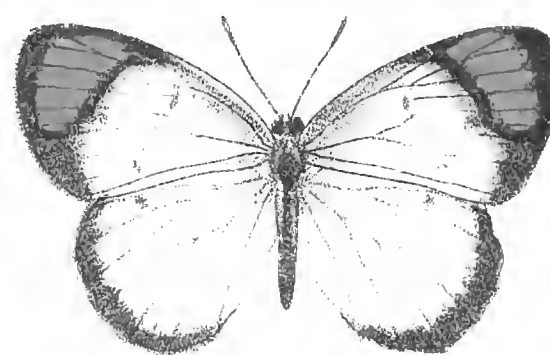
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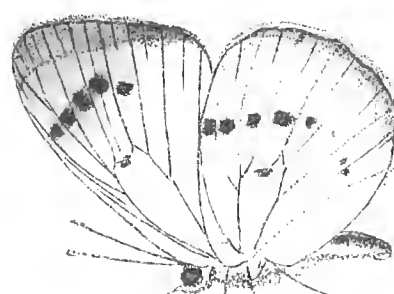




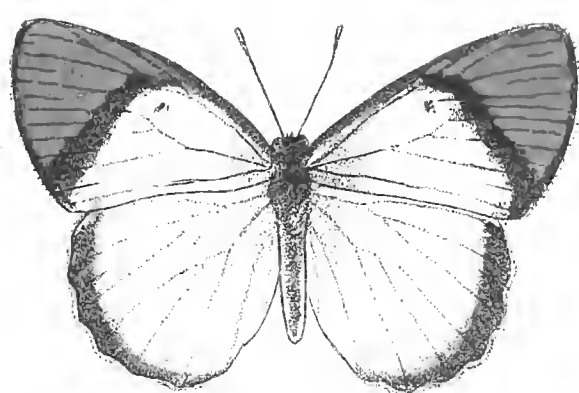
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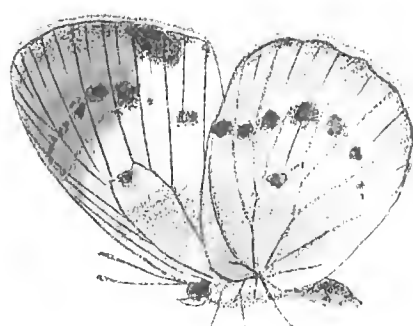
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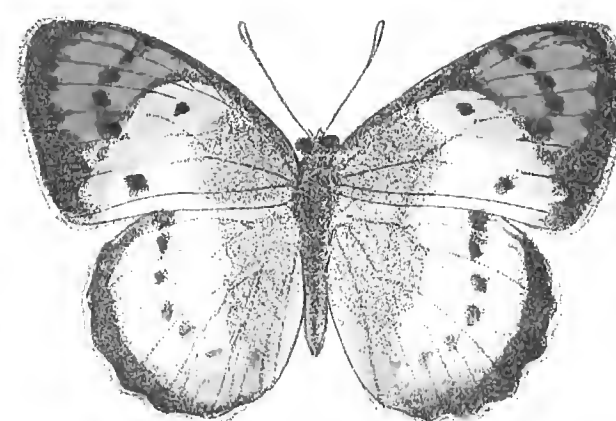
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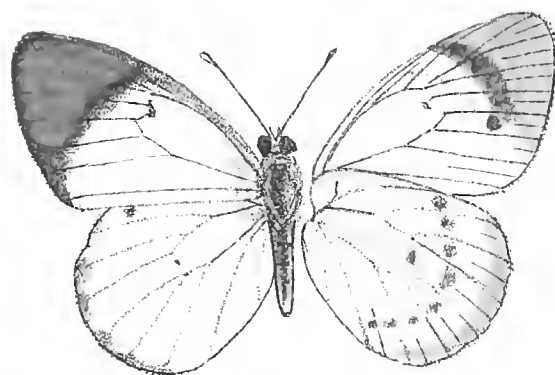
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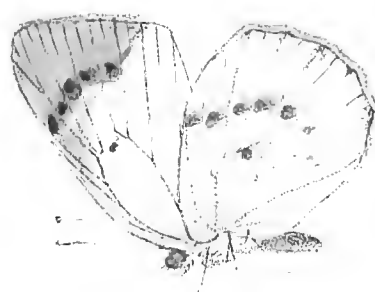
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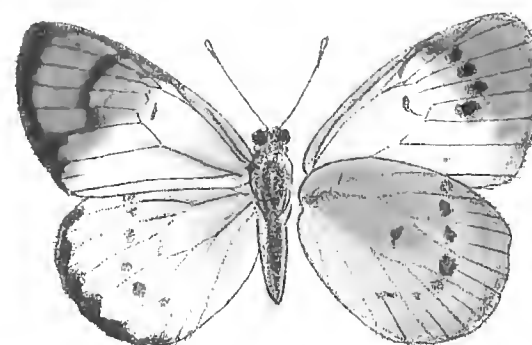
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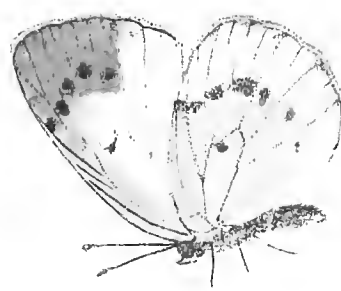
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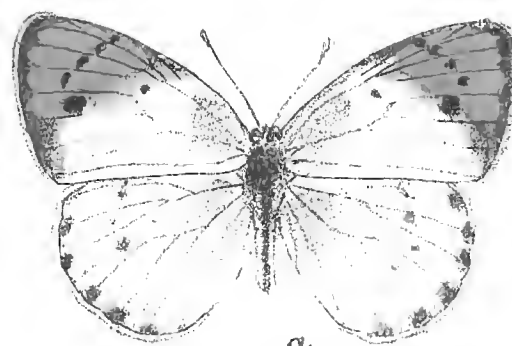
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4



4<sup>c</sup>



4<sup>a</sup>

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